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FEDERATED MALAY STATES.

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ANNUAL REPORT

ON THE

MEDICAL DEPARTMENT

FOR THE YEAR

1924

BY

THE PRINCIPAL MEDICAL OFFICER,
FEDERATED MALAY STATES.

KUALA LUMPUR:
PRINTED AT THE FEDERATED MALAY STATES GOVERNMENT PRESS.
1925.

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FEDERATED MALAY STATES.

ANNUAL MEDICAL REPORT FOR THE YEAR ENDING 31ST DECEMBER, 1924.

I.—ADMINISTRATION.

STAFF.

The total staff of the Medical Department, Federated Malay States, including all branches on the 31st December, 1924, was 847. It was divided as follows:

Hospital Branches	745
Health Branches	42
Institute for Medical Research	21
Central Mental Hospital	16
Veterinary Branch	23
Total ...	847

2. The following were the principal changes which took place:

Dr. F. E. Wood, Senior Medical Officer, Perak, proceeded on leave on 29th February, 1924, and Dr. Skeen acted for him until his return on 24th October, 1924, when he resumed his appointment as Senior Medical Officer, Negri Sembilan.

Dr. Masters acted as Senior Medical Officer, Selangor, during the absence on leave of Dr. Cosgrave from 29th March, 1924, until the end of the year.

Dr. Dive acted as Senior Medical Officer, Pahang, from 25th March, 1924, until the end of the year.

During the year the following officers were appointed:

Dr. M. J. Graham as Health Officer on 14th March, 1924.
Dr. C. F. Constant as Radiologist on 11th April, 1924.
Dr. A. N. Kingsbury as Pathologist on 14th April, 1924.
Miss M. Hewitson as Lady Medical Officer on 20th May, 1924.
Mr. R. Macgregor as Veterinary Surgeon on 4th July, 1924.
Dr. C. F. Ashby as Medical Officer on 18th July, 1924.
Dr. V. D. Wyborn as Health Officer on 1st August, 1924.
Dr. R. P. Bliss as Health Officer on 1st August, 1924.
Dr. F. Wilson as Assistant Medical Superintendent on 15th August, 1924.
Captain K. B. Williamson as Malaria Research Officer on 29th August, 1924.
Dr. R. J. Colbert as Medical Officer on 25th October, 1924.

Promotions.

Captain J. W. Hoflin promoted to Personal Assistant to the Principal Medical Officer, Federated Malay States, with effect from 1st October, 1923.

Transfers.

Dr. T. W. H. Burne exchanged for Dr. Phillips as a temporary measure to the Federated Malay States service on 1st December, 1924, to act as Chief Surgeon, Selangor, during the absence on leave of Dr. E. N. Graham from 3rd November, 1924.

Retirement.

Dr. J. C. Rowan terminated his service on 3rd August, 1924, on expiry of agreement.

Dr. R. L. Symes resigned on 1st April, 1924.

Assistant Surgeons, 58.

The following were appointed during the year:

Mr. V. S. Bhatthal on 22nd April, 1924.
Mr. P. Nadarajah on 22nd April, 1924.
Inche Husin bin Mhd. Ibrahim on 22nd April, 1924.
Mr. E. S. R. Alfred on 4th June, 1924.
Mr. J. S. Goonting on 15th September, 1924.

Retirement.

Mr. A. Dutta retired on pension on 21st July, 1924.

EUROPEAN NURSING SISTERS.

APPOINTMENTS.

Miss W. C. Chapman, Sister, on 29th February, 1924.

Miss C. M. Hardy, Sister, on 8th March, 1924.

Miss B. T. Sparks, Sister, on 8th March, 1924.

Miss M. Powell, Sister, on 14th March, 1924.

Miss C. Ambrose, Sister, on 14th March, 1924.

Miss C. S. W. Brown, Sister, on 14th March, 1924.

Miss E. M. McDougall, Sister, on 14th May, 1924.

Miss D. M. Hodgson, Sister, on 19th December, 1924.

Miss M. A. S. Leslie, Sister, on 19th December, 1924.

PROMOTIONS.

Miss F. B. Pearn promoted to Matron I on 30th November, 1923

Miss E. Rogerson promoted to Matron I on 6th September, 1924.

Miss E. J. McCarthy promoted to Matron II on 30th November, 1923.

Miss L. M. Jacobs promoted to Matron II on 30th November, 1923.

Miss M. Begg promoted to Matron II on 30th November, 1923.

Miss A. L. Wispler promoted to Matron II on 6th September, 1924.

RETIREMENT.

Miss M. J. Gillespie, Matron, Grade I, retired on pension on 6th September, 1924.

RESIGNATIONS.

Miss E. M. Gilbert, Nursing Sister, resigned on 26th February, 1924.

Miss C. M. McCrystal, services terminated on expiry of agreement on 21st May, 1924.

Miss N. R. Hunter, services terminated on expiry of agreement on 16th June, 1924.

Miss E. Hammersely, services terminated on expiry of agreement on 9th November, 1924.

Miss M. K. O'Shea, services terminated on expiry of agreement on 24th October, 1924.

Miss O. Borrett, services terminated on expiry of agreement on 24th October, 1924.

FINANCIAL.

3. (*a*) Statement of Revenue for the year 1924—

Revenue (Hospital fees, licences, etc.) ...	...	$ 222,012

(*b*) Statement of Expenditure for the year 1924—

Personal Emoluments and Other Charges ...	...	3,390,640

II.—PUBLIC HEALTH.

(*a*).—GENERAL REMARKS.

4. The general health of the Federated Malay States has continued satisfactorily and the death-rates from the principal diseases, malaria, dysentery, diarrhoea and pulmonary tuberculosis have been lower than for any year under review for the last ten years. It is assumed that the population has increased at the same rate as during the interannual period.

5. The general death-rate for 1924 was 23.68 per mille as against 24.40 per mille in 1923 and 25.72 per mille in 1922.

6. The number of in-patients treated in hospitals was 90,883 with 6,853 deaths and a death-rate of 7.54 as compared with 87,310 with 6,762 and a death-rate of 8.05 in 1923.

(*b*).—SICKNESS AND DEATH-RATES.

The distribution of patients in the different States is shewn below:

States.	1923.			1924.		
	Cases.	Deaths.	Death-rates.	Cases.	Deaths.	Death-rates.
Perak	41,097	2,994	7.29	41,102	3,091	7.52
Selangor	27,571	2,220	8.04	30,192	2,186	7.24
Negri Sembilan	13,725	1,131	8.24	13,354	1,079	8.08
Pahang	4,917	417	8.48	6,235	497	7.97
Total ...	87,310	6,762	7.74	90,883	6,853	7.54

7. The above figures show an increase in the number of patients treated, but a slightly lower death-rate.

8. The principal diseases commonly treated in hospitals were malaria, venereal diseases, ankylostomiasis, dysentery, diarrhoea, beriberi, pneumonia and pulmonary tuberculosis. The following table shows the number of cases and deaths during the years 1923 and 1924:

Diseases.	1923.			1924.		
	No. of cases.	No. of deaths.	Percentage of deaths.	No. of cases.	No. of deaths.	Percentage of deaths.
Malaria	21,082	1,062	5.03	18,045	852	4.72
Venereal diseases...	4,892	65	1.32	3,588	50	1.39
Ankylostomiasis ...	4,029	300	7.44	3,334	204	6.11
Dysentery	3,310	711	21.48	3,218	649	20.17
Diarrhoea	1,253	81	6.46	1,353	94	6.94
Beri-beri	771	107	13.87	991	120	12.10
Pneumonia ...	1,815	711	39.17	1,811	745	41.13
Pulmonary tuberculosis	2,157	1,006	46.68	2,375	1,037	43.66

Malaria.

9. The number of cases treated in hospitals again shows a decrease. In 1922 there were 26,072 cases, in the following year 21,082, and in 1924 there were 18,045 cases, being 3,037 less than in 1923. The death-rate has also again decreased to 4.72 as against 5.03 in 1923 and 5.38 in 1922.

There is no doubt that the propaganda carried out by the Malaria Advisory Board by means of posters, pamphlets, and lantern lectures, especially the latter, is one of the factors in the gradual reduction of malaria.

The systematic distribution of quinine, and good work by the outdoor and travelling dispensaries have been also potent factors in improving the treatment of malaria outside the hospitals.

The Mosquito Destruction Boards are permanently established. By systematic drainage and eradication of breeding places, they are doing much valuable work in combating malaria, and are doubtless responsible to a great degree for the reduction in the numbers of cases.

Venereal Diseases.

10. The total number of cases treated were 3,586 with 50 deaths. The venereal disease clinic at the District Hospital, Kuala Lumpur, has continued successfully. A new clinic, opened in July in the town area, treated a total of 1,186 cases of venereal diseases, of which 161 were females.

Propaganda in the form of lantern lectures and the wide distribution of pamphlets in all languages and photos was extended by the Committee for Public Health Education.

Injections of arsenical compounds are given at all Government hospitals and dispensaries. The following are the figures for the different States:

States.	1923.	1924.
Perak	15,550 ...	14,217
Selangor	10,282 ...	10,525
Negri Sembilan	2,739 ...	3,244
Pahang	1,104 ...	2,030
Total ...	29,675 ...	30,016

Ankylostomiasis.

11. A total of 3,334 cases were treated in 1924 as compared with 4,029 in 1923. These figures are only for cases which were treated for this disease alone.

Proposals for the "Mass treatment for this disease on the lines of the Rockfeller Foundation" were put before Government who unfortunately did not approve of the proposals.

The preliminary educational work has been carried out by means of lectures and demonstrations to Penghulus and kampong people.

A trial treatment was made in the Ulu Selangor district, Selangor, and a small campaign was started in December in the Batang Padang district, Perak, amongst Malays, and 2,308 cases were treated in less than a month.

Dysentery and Diarrhoea.

12. The total number of cases treated in hospitals was 4,571 with 743 deaths, showing a death-rate of 16.25 per mille as against 4,563 with 792 deaths and a death-rate of 17.35 per mille in 1923.

The types were as follows:

Amoebic.	Deaths.	Bacillary.	Deaths.	Diarrhoea.	Deaths.
1,310 ...	215 ...	1,908 ...	434 ...	1,353 ...	94

Three cases of chronic dysentery were diagnosed, of which two died.

In such cases and in cases of suspected sprue Scott's parathyroid treatment has given excellent and in some cases surprisingly good results.

Beri-Beri.

13. There was a slight increase in the numbers of cases treated in hospitals over that of 1923, but the death-rate was slightly lower. The number of cases being 991 as compared with 771. The death-rate was 12.10 as against 13.87 in 1923. A good many cases came from mines situated in places difficult of access. No propaganda or other methods seem effectual in controlling the use of polished rice or increasing the use of undermilled rice. Even Malays and Tamils are taking to polished rice.

Pneumonia.

14. There was a slight decrease in the numbers treated which were 1,811 cases as against 1,815 cases in 1923. The death-rate was slightly higher, being 41.13 as against 39.17 in the preceding year. The reports on the treatment by intravenous injections of Iodine are somewhat difficult to give a true value to. One Senior Medical Officer reporting disappointing results, and another an improvement in the death-rate of cases so treated. A few cases were treated with Optochin which is reported to be a specific against pneumonic infection, the results were few but encouraging.

Pulmonary Tuberculosis.

15. The number of cases treated in hospitals during the year under review was 2,375 with 1,037 deaths and a death-rate of 43.66 per mille as compared with 2,157 with 1,006 deaths and a death-rate of 46.64 per mille in 1923. The percentage of T.B. cases to all cases treated at hospitals is not high. In Perak of a total number of 39,371 patients admitted to hospital only 2.54 per cent. were T.B. In that State the Kampar Hospital has been used for the reception of most of the tubercular cases, a fact not to be forgotten when considering that hospital's death-rate.

Smallpox.

16. The total number of cases notified was six with one death. Owing to the care taken in vaccinating and isolating there was no spread of this disease. The Health Branch staff deserve great credit for their good work in the prophylactic measures taken against this disease and also in the case of cholera.

Tropical Typhus Fever.

17. Eleven cases of this disease, with one death, occurred during the year, eight in Selangor, two in Negri Sembilan and one in Pahang. It is questionable whether this is true typhus fever though clinically the cases closely resemble it. These cases may be allied to tick-borne fever, similar to Rocky Mountain fever. The investigation is in the hands of the Institute for Medical Research.

Enteric Fever.

18. There were 105 cases with 29 deaths during the year as against 135 cases and 33 deaths in 1923. The incidence of this disease is carefully watched, and careful diagnostic measures are insisted on, while the cause of such case and source of infection are traced so far as possible.

Diphtheria.

19. The total number of cases notified was 43 with 17 deaths as compared with 22 cases and 7 deaths in 1923. Most of the cases were sporadic and the source of infection was not discovered. This disease shows a marked increase, and every effort is being made to discover "carriers" and treat them. This investigation is carried out by the Institute for Medical Research and the Health Branch.

Yaws.

20. The treatment of yaws by injection of arsenical compounds was continued. A total number of 36,003 injections were given. The number of cases treated in each State is shown in comparison with the number treated in 1923 in the following table:

States.	1923.	1924.
Perak	14,149 ...	9,884
Selangor	4,381 ...	2,231
Negri Sembilan	9,358 ...	7,267
Pahang	3,247 ...	3,997
Total ...	31,135 ...	23,380

The decrease in the number of cases treated may be taken as a satisfactory sign that the campaign against yaws is gradually taking effect, but it must be continued for many years to come to reach a successful conclusion.

Influenza.

21. There were 3,825 cases with 58 deaths as compared with 2,219 cases with 80 deaths in 1923 and 1,653 cases with 46 deaths in 1922. This disease seems to be on the increase, the number of cases being more than double of those occurring in 1922.

The prevailing type was the catarrhal variety and a frequent complication was Herpes labialis, and abdominal pains were associated in some cases and presented difficulties in diagnosis. Sudden relapses were a notifiable feature, generally the disease was of a mild type but probably predisposes to pneumonia, and accounts for many cases of the latter disease.

Eye Diseases.

22. *Out-patients.*—The number of new cases during the year at the eye clinics at Kuala Lumpur, Ipoh and Taiping was 3,367, an increase of 1,832 of the figures for the preceding year. There were 13,240 attendances as compared with 9,011 for 1923.

This work is very valuable and the staff concerned deserve great credit.

In-patients.—Seven hundred and sixty-nine cases were admitted into hospital, an increase of 563 of the number admitted during the year 1923.

The above figures show a very satisfactory increase in the treatment of eye cases and the results have been most encouraging and the tendency of the Asiatics to visit so-called great "eye-specialists" is decreasing. As in former years conjunctivitis accounted for the majority of the cases seen.

An outbreak of conjunctivitis occurred at one of the schools in the Kuala Pilah district of Negri Sembilan. Fifty-eight children and twenty-seven adults were affected. All the cases were cured.

Eye Operations.—A total number of 458 operations were performed during the year.

Surgery.

23. *Operations.*—The number of operations undertaken during the year is shewn below:

States.	Major.		Minor.	
	1923.	1924.	1923.	1924.
Perak	551	380	4,651	2,623
Selangor	337	382	1,293	1,379
Negri Sembilan	61	86	1,115	1,098
Pahang	12	13	266	282
Total ...	961	861	7,325	5,382

A report by Mr. Pasley, Chief Surgeon, Perak, is attached as an appendix. Owing to Mr. Graham's absence on leave the report on Selangor is not available for publication, but in both States much good surgical work has been performed.

Vaccination.

24. During 1924 the number of vaccinations performed was 78,407 as against 77,724 in the previous year. The following are the figures for the various States:

States.	1923.	1924.
Perak	53,926	54,278
Selangor	11,075	11,745
Negri Sembilan	6,366	6,563
Pahang	6,357	5,821
Total ...	77,724	78,407

Women's Hospitals and Wards.

25. The work in the women's hospitals and wards continues very satisfactorily and the Lady Medical Officers are becoming increasingly popular amongst the Asiatics. In the Kuala Pilah Women's Hospital in which there are 47 beds, the daily average number of patients for the year was 45.57.

Out of a total number of 875 patients treated at Kuala Kangsar Women's Hospital, 209 were Malays.

The Lady Medical Officers work has not been confined to the hospitals but has extended to the kampongs, and a word of praise must be given to the Sisters, Nurses and Malay female staff who have greatly helped to make the Lady Medical Officer's work successful.

Children's Wards.

26. By way of experiment a ward of ten beds was reserved for children in the Ipoh Hospital. The Lady Medical Officer reports that there has been less trouble than was anticipated in excluding relatives and in keeping the children sufficiently long to obtain satisfactory results, especially in cases of malnutrition and helminthiasis, yet it was by no means an unmixed success.

It cannot yet be hoped to open children's wards in the other larger hospitals, the mothers are not yet sufficiently educated to realize the advantage to sick children of a temporary separation from their parents.

Inspection of Schools.

27. This was continued throughout the year partly by the Medical Department and partly by the Health Department. As emphasised in the 1923 report, this system is not satisfactory and special Medical Officers and Lady Medical Officers are urgently needed, whose sole duty would be the inspection of schools.

The diseases most frequently met with were enlarged spleens, scabies and anaemia. A very large number of children are infected with worms. Several cases of dental caries occurred.

An examination of eyes and eyesight of school children in the Kinta district of Perak was carried out, and 1,977 children from the English schools, and 1,088 from the Malay vernacular schools were examined.

English Schools.—Out of the 1,977 children examined 317 had defective eyesight such as errors of refraction, inflammation of the lids, cornea, conjunctivitis, squint, etc.

Malay Schools.—One thousand and eighty-eight children were examined, of whom 102 were girls; none showed any defect and all possessed perfect vision. Only 42 boys could be classed as defective in any way.

The following table shows the comparison between the figures obtained from the English schools and those from the Malay vernacular schools:

	Government schools.	Malay schools.
Number of children examined	1,977	1,088
Errors of refractions	192	3
Other defects	125	39
Percentage of defection	16.3	4.2

The vision of the school children examined in Kinta may be described as good. Malay school children had better eyesight than other races. The influence of increased age, and the greater use of eyes for close work in the production of refraction errors, is well exemplified in both sets of schools.

Leper Asylums.

28. *Kuala Lumpur.*—The total number of lepers treated during the year was 524 with 37 deaths and a death-rate of 7.06 per mille as against 443 with 41 deaths and a death-rate of 9.25 per mille in 1923.

In June eleven children, who had been born in the Asylum, were removed with the consent of their parents and given suitable accommodation elsewhere. Two of these apparently healthy children developed signs of leprosy, and were sent back to the Asylum and their parents.

The Tai Fong Chee treatment has been carried out throughout the year with encouraging results. Of 270 lepers, who have taken this treatment regularly for over three months, 203 have improved; a percentage of 75, and of 136, who have taken it for 9 months and over, 117 have improved. About 50 of these are no longer recognisable to the public eye, as lepers, and some of them are bacteriologically negative so far as can be ascertained. The Medical Officer deserves great credit for his admirable work.

Pulau Pangkor Laut.—In this Asylum, which is for Malays only, there were 62 cases of leprosy with three deaths. The general health of the patients was satisfactory. All cases were treated with Chaulmoogra oil by the mouth and 22 cases were treated by intramuscular injections of E.C.C.O. The Tai Fong Chee treatment is being tried here also.

Taiping Leper Wards.—During the year 207 cases were treated with 11 deaths. Out of this number 106 were sent to Pulau Jerejak and Pulau Pangkor Laut during the year.

X-Ray and Electrical Treatment.

29. Dr. Harrison acted as Radiologist until the arrival of the newly appointed Radiologist, Federated Malay States, Dr. Constant, on 8th May, 1924. It was found necessary to rebuild entirely, and in great part to redesign the whole of the existing X-Ray apparatus. This was urgently necessary, primarily on the grounds of safety, as there was found to be a great danger of X-Ray burns owing to large leakage of rays from the old type apparatus. The equipment at the Institute for Medical Research had been abandoned as its original complete unsuitability for this climate and the subsequent maltreatment it suffered had nearly destroyed it. The rebuilding and protection of both sets was carried out by the Radiologist, using a few locally purchased materials.

Unfortunately, no work has been possible so far towards adequate ventilation of the X-Ray rooms, as it is difficult to alter existing buildings, and, in consequence, neither department sanitarily is safe.

A complete photographic dark room has been built and equipped at the General Hospital. Previously, about $1,500 was paid annually to local photographers for developing plates and films. This is now done in the department at far less cost.

The plans for the new radiological and electro-theraputic department have been made out in detail, and the equipment decided upon, and it is hoped that the building of this will soon be commenced.

The method previously adopted in annual reports in showing the number of examinations and treatments has been discontinued, as it gave merely the number of mechanical operations performed, such as so many radiograms taken, or so many electrical treatments given. The figures given below show the actual number of patients treated or examined. This method of recording will be used in future.

Radiological cases	854	
Radio-treatment cases	17	(226 treatments)
Electro-therapy cases	66	(417 ,,)

(*c*).—VETERINARY BRANCH.

30. *Rinderpest.*—Several outbreaks of this disease occurred in Pahang mostly in the Kuantan district. The source of infection could not be traced, but it is most likely that the outbreaks in the early part of the year owed their origin to the outbreaks at Sungei Lembing in the previous November and December. An outbreak at Sungei Ular was due to cattle imported from Trengganu. During the various outbreaks in Pahang 699 cattle and 13 buffaloes were inoculated with anti-rinderpest serum.

Ten cases with five deaths occurred in the Selangor cattle quarantine stations. All these animals came from Saigon.

Foot-and-Mouth Disease.—Outbreaks of this disease amongst cattle occurred in the various districts and quarantine stations; of these two very severe outbreaks occurred in Lower Perak, where there were 3,477 cases with 17 deaths, and Selangor where there were 1,735 cases with 9 deaths.

The total number of cases which occurred in all four States was 7,249 with 37 deaths.

Surra.—A case of surra in dog was discovered in September in Perak, the animal was destroyed. There were no cases of rabies, swine fever or glanders during the year under review.

VETERINARY QUARANTINE STATIONS.

Port Swettenham.—Eleven thousand four hundred and three animals passed through this station during the year as against 8,519 during the year 1923.

Bukit Sentul.—Four hundred and twenty-seven animals were quarantined, these animals arriving from Saigon and Kedah.

Kuantan.—Three thousand three hundred and fifty-two animals passed through this station during the year under review.

Perak.—The total number of buffaloes and cattle imported and passed through the quarantine stations was 5,106 as against 5,248 in 1923. They were distributed as follows:

Port Weld	1,988
Parit Buntar	488
Selama	718
Upper Perak	929
Teluk Anson	983
Total ...	5,106

VETERINARY PROSECUTIONS.

There were 1,316 prosecutions resulting in 1,279 convictions. The fines imposed amounted to a total of $12,194.

Although the staff is small in numbers, the work is of a very high order, and the comparative immunity from cattle disease enjoyed by the Federated Malay States, is due to the excellent work of the Veterinary Surgeons and their subordinates.

(*d*).—GENERAL EUROPEAN AND NATIVE POPULATIONS.

31. The general health of the European population continued to be good. There was comparatively very little sickness and invaliding. The total European and American population as estimated at the end of June, 1924, was 6,467. There were 112 births, giving a birth-rate of 17.32 per mille and 36 deaths with a death-rate of 5.57.

Accurate figures for illness and invaliding of Europeans and others cannot be obtained as only a certain percentage are attended by Government Medical Officers.

32. Vital statistics, estimated native population per year, birth and death-rates, infantile mortality, etc., will be found in the report of the Senior Health Officer, Federated Malay States, which is appended.

III.—SANITATION.

33. The Health Branch of the Medical Department has, as in previous years, being very much understaffed during the whole of 1924.

It is hoped that in 1925 to largely augment the staff of the Health Branch and efforts are being made to bring it on to its full establishment.

The work of the Mosquito Destruction Boards is becoming increasingly important, and is a great factor in the reduction of the number of malaria cases, and in the elimination of the breeding places of mosquitoes.

There were no epidemics of any magnitude during 1924.

The infantile mortality reaches practically the same figure as for 1923, viz., 180.53 per 1,000. In Negri Sembilan and Pahang it is higher than in Perak and Selangor.

In Pahang the high rate is probably largely due to the great distances to be covered and shortage of staff.

The Federated Malay States was singularly free from Zymotic disease during 1924. The death-rate recorded in para. 45 of the Senior Health Officer's report under Taiping is very high and is due to a combination of an old town and excessive rainfall. Under section 46 of the Senior Health Officer's report the death-rates for the past seven years are shown. Kuala Lumpur death-rate has dropped from 26.36 to 16.74, Ipoh from 23.56 to 13.89, Seremban from 45.38 to 17.34 and Taiping from 37.45 to 33.91. The influenza year 1918 is neglected and the 1924 death-rate is on the truer basis of three months residence against one month as formerly. The Senior Health Officer's remarks in general are very valuable and his comments on the excellent work of the District Officer, Port Dickson, on anti-malarial measures can be cordially endorsed by every one who has studied the work done there.

The Senior Health Officer and his staff are to be congratulated on the results obtained in the face of great difficulties.

An event of great importance was the appointment of the Commission on Estate Health which sat during 1924.

The prime mover for the appointment of the Commission was the Medical Department, and this was the first movement ever made to place the work of estate health, sanitation and treatment on a satisfactory and sound basis in the Federated Malay States.

The report of the Commission, the evidence and the remarks of various persons concerned are published, but the Commission's report should be studied in close connection with the memoranda from various authorities, or the evidence or its significance is lost.

PUBLIC HEALTH EDUCATION.

34. Propaganda by means of posters, pamphlets and hand bills issued by the Malaria Advisory Board, Committee for Public Health Education and Infant Welfare Advisory Board was continued during the year.

Lectures in the Malay language on malaria, illustrated by lantern slides, were given in schools and kampongs throughout the Federated Malay States. They were all very well attended, and aroused great attention, and keen interest was displayed by the various audiences. There is no doubt that the native appreciates a picture and understands it.

During the year a second lantern was obtained, and lectures were commenced in the Chinese language. They are being given in the mining camps, and Chinese schools. These lectures are proving very successful, and the lecturer is generally asked many questions at the conclusion of the lecture.

At the Agri-Horticultural Show held in Kuala Lumpur in July a very excellent exhibit of anti-malaria measures and Infant Welfare work was put up. There was also an anti-beriberi demonstration, and a collection of exhibits on various health subjects. The buildings in which these were housed was never empty of visitors during the show. Lectures were given all day in various languages and it is estimated that there were 20,000 visitors. Great credit is due to the Secretary of the Boards for the successful organisation of these exhibits.

A small anti-malaria exhibit was put up at an outstation agri-horticultural show in October; it was extremely popular, and it is hoped when circumstances permit to put up these small exhibits at several horticultural shows.

The following pamphlets and posters were issued during the year:

1. "Hookworm Disease" (in four languages).
2. "Convulsions" (in four languages).
3. "Care of the Teeth" (in four languages).
4. "A few words on the subject of Venereal Diseases" in English.
5. "Consumption" in English.
6. "Opium Habit" in Chinese.
7. "Advice to Nursing Mothers" (in four languages).
8. "Hints to Nursing Mothers".
9. "Yaws" in English and Jawi.
10. "Malaria, in its relation to man and mosquito" in English.
11. "Malaria" in English and Jawi.
12. "Leprosy" (in four languages).
13. "Spitting" (in four languages).
14. "Consumption, its cause, its cure and its prevention" (in four languages).
15. "A Catechism of Consumption" (in four languages).
16. "A few words on the subject of Venereal Diseases" (in three languages).

IV.—METEOROLOGY.

35. Rainfall in inches in the principal towns:

	Inches.	Average monthly rainfall. Inches.
Kuala Lumpur	88.32	7.36
Ipoh	104.95	8.75
Taiping	165.72	13.81
Seremban	73.25	6.10
Kuala Lipis	104.76	8.73

Meteorological statistics will be compiled by the Museums Department in future.

V.—HOSPITALS AND DISPENSARIES.

36. *Out-patients.*—The number of out-patients treated by all hospitals, dispensaries and travelling dispensaries for 1924 was 584,261 as compared with 527,414 in 1923, the following figures show the number treated during the years 1922, 1923 and 1924:

States.	1922.	1923.	1924.
Perak	150,157	190,990	221,096
Selangor	128,806	159,402	177,896
Negri Sembilan ...	81,711	92,692	96,432
Pahang	72,437	84,329	88,837
Total ...	433,111	527,414	584,261

The increase in the years 1923 and 1924 is doubtless due to the re-starting of the travelling dispensaries in 1922. These are very popular as they get into touch with the villagers in the outlying districts. They have a fixed itinerary, and visit the various places at regular and known dates and hours. The number of Malay patients who attend at these dispensaries is increasing.

The travelling dispensary boats on the Pahang river are also doing very useful work, they dealt with not less than 8,817 cases in the year under review. It is hoped to have ambulance motor launches on the Perak and Pahang rivers in the near future. This would enable a Medical Officer or Lady Medical Officer to visit those villages and kampongs which get very little medical attendance at present, and there is good reason to believe that a swift-service will bring more cases from the river-banks to hospital than are willing to come by poled house-boats.

VI.—INFANT WELFARE WORK.

37. Infant Welfare has been highly successful during the year and the attendances at the clinics of Kuala Lumpur, Ipoh and Taiping have greatly increased. The Kuala Lumpur Centre has been rebuilt on modern lines and is very popular amongst all classes of Asiatics, and the staff of the Centre are to be congratulated on the excellent work done.

Appended are the reports of the Lady Medical Officers of the Kuala Lumpur and Ipoh Centres. The last-named has done remarkably well under the Lady Medical Officer there, and the lady acting at Kuala Lumpur must also be congratulated by her able filling of the post.

VII.—PRISONS.

38. During 1923 the general health of the prisoners and the sanitation of the prisons have continued satisfactory. The chief diseases prevalent were malaria, dysentery, tuberculosis and diarrhoea. The total number treated during the year in the different gaols hospitals was 933 with 15 deaths and a death-rate of 1.6 as against 1,280 cases with 32 deaths and a death-rate of 2.5 for 1923. They were distributed as follows:

Place.	1923.			1924.		
	Cases.	Deaths.	Per-centage.	Cases.	Deaths.	Per-centage.
Pudu Gaol, Kuala Lumpur ...	316	6	1.89	211	3	1.42
Gaol, Taiping	465	17	3.65	169	7	4.14
„ Batu Gajah	188	6	3.19	255	2	.78
„ Papan	11	—	—	15	—	—
„ Serembau	258	2	.77	208	1	.48
„ Kuala Lipis	17	1	5.88	42	1	2.38
„ Kuantan	25	—	—	33	1	3.03
Total ...	1,280	32	2.5	933	15	1.6

VIII.—TEMPORARY CHINESE DECREPIT ASYLUM, PORT SWETTENHAM.

39. This most useful institution has been well maintained during the year, 517 decrepits were admitted, 24 were discharged as fit for work, 157 absconded, 239 were transferred and 38 died, leaving 444 inmates at the close of the year. The highest number in the camp at any one time was 499.

Bamboo baskets, coir brooms, mattings, rattan brooms, and baskets to the value of $2,780 were made by the inmates.

The workshop was always busy and about 36 per cent. of the inmates worked there: Yet the place is unsuitable and the inhabitants of Port Swettenham do not like the proximity of 400 decrepits who are by no means as helpless as the name implies.

It is hoped that the scheme of the home at Sungei Buloh where land has been taken up will be gone on with rapidly.

IX.—CURE FOR OPIUM HABIT.

40. Reports on this treatment vary. The Medical Officer, District Hospital, Kuala Lumpur, reports very favourably, while the Medical Officer, Klang, is more than dubious as to the results, and the Assistant Surgeon, Kuala Kubu, finds the patients are so disorderly that he never has more than 50 per cent. of beds available filled.

It is too early to pronounce definitely on the treatment and it is doubtful how many cases have really been followed up after discharge from hospital. The treatment and arrangements may be shortly described as follows.

The Selangor Anti-Opium Chinese Society supplies applicants with an admission ticket to hospital. The holder presents himself to the Medical Officer, when it is explained to him that he can go freely about the hospital, but if he leaves it he will be discharged. Special cooks and diet are provided. The patient is then treated with atropine, and is tided over the first days when his craving for opium is strongest. Gradually the atropine is stopped, and the patients' health is restored, and at the end of three weeks he is discharged free from his craving, and it is hoped that a permanent cure is effected in the majority of cases. Government defrays all expenses.

X.—SCIENTIFIC.

Comments on the Report of the Director of Government Laboratories, F.M.S.

41. The report of the Director of Government Laboratories contains very interesting remarks on the Institute for Medical Research's new Pasteur treatment work. The report on cases of tropical typhus fever is of great interest.

Further investigations on melioidosis were conducted.

Comments on the Report of the Medical Superintendent, Central Mental Hospital.

42. The report of the Central Mental Hospital is an interesting document well worth study, and attention is again especially directed to the Superintendent's warnings concerning the use of alcohol in place of opium by the Chinese.

The farm work has as usual been highly successful.

43. The following reports are attached as appendices:

A.—Report of the Director of Government Laboratories.

B.—Report of the Malaria Bureau.

C.—Report of the Chemical Laboratories, Institute for Medical Research.

D.—Report of the Senior Health Officer.

E.—Report of the Registrar-General.

F.—Report of the Chief Surgeon, Perak.

G.—Report of the Lady Medical Officer, Infant Welfare Centre, Kuala Lumpur.

H.—Report of the Lady Medical Officer, Infant Welfare Centre, Ipoh.

I.—Report of the Medical Superintendent, Central Mental Hospital.

J.—Report of the Secretary, Malaria Advisory Board.

R. DOWDEN,

20th April, 1925. *Principal Medical Officer, Federated Malay States.*

TABLE 1.

RETURN OF DISEASES AND DEATHS (IN-PATIENTS) FOR THE YEAR 1924.

Diseases.	Remaining in Hospital at the end of 1923.	Yearly total.		Total cases treated.	Remaining in Hospital at the end of 1924.	Remarks.
		Admissions.	Deaths.			
Beri-beri	101	890	120	991	105	
Cerebro-spinal fever	...	7	4	7	...	
Chicken-pox	2	92	...	94	3	
Cholera	3	2	2	5	...	
Dengue	...	21	...	21	1	
Diphtheria	1	34	16	35	3	
Dysentery, amœbic	60	1,250	215	1,310	51	
„ bacillary	72	1,836	434	1,908	80	
Endocarditis—infective	...	...	...	...	...	
Enteric	8	101	29	109	7	
Erysipelas	4	63	14	67	6	
Gonorrhœa	78	1,348	1	1,426	58	
Influenza	75	2,940	58	3,015	83	
Typhus fever	...	9	1	9	1	
Leprosy (*a*) Nodular	98	221	13	319	88	
(*b*) Anæsthetic	18	100	6	118	48	
(*c*) Mixed infection	348	181	37	529	427	
Malaria (*a*) Tertian	111	4,019	76	4,130	139	
(*b*) Quartan	28	714	25	742	29	
(*c*) Æstive—autumnal	209	8,679	572	8,888	248	
(*d*) Chronic malaria	134	3,293	136	3,427	91	
(*e*) Black-water	...	1	...	1	...	
(*f*) Mixed infection	10	484	40	494	6	
(*g*) Type undiagnosed	5	367	3	372	17	
Measles	9	178	5	187	1	
Malta fever	...	...	...	...	...	
Plague	...	...	...	...	...	
Pneumonia	72	1,739	643	1,811	66	
Rabies	...	1	...	1	...	
Pyrexia of uncertain origin	12	1,231	19	1,243	33	
Relapsing fever	...	...	...	...	...	
Rheumatic fever	1	70	...	71	2	
Rheumatism	12	290	3	302	17	
Septicæmia	1	81	68	82	. .	
Trypanosomiasis (sleeping fever)	...	...	...	...	...	
Smallpox	1	3	1	4	...	
Syphilis (*a*) Primary	...	...	...	...	...	
(*b*) Secondary	40	530	1	570	35	
(*c*) Inherited	86	1,095	26	1,181	66	
(*d*) Tertian	39	413	19	452	47	
(*e*) Other syphilitic diseases	...	14	3	14	1	
Tetanus	...	88	64	88	1	
Tuberculosis	198	2,177	1,037	2,375	189	
Whooping cough	...	14	1	14	...	
Yaws	7	209	...	216	7	
Yellow fever	...	...	...	...	...	
Other infectious diseases	15	223	16	238	9	
Intoxications (Alcoholism	1	27	1	28	...	
Intoxications (Morphinism	...	1,717	7	1,717	110	
Intoxications (Others	...	11	2	11	...	
Anæmia	36	1,011	177	1,047	64	
Anæmia—pernicious	...	11	5	11	...	
Diabetes	5	56	9	61	1	
Exophthalmic goitre	...	...	...	...	...	
Gout	...	2	...	2	...	
Leucocythæmia	...	...	...	...	...	
Hodgkin's disease	...	...	...	...	...	
Myxœdema	...	...	...	...	...	
Purpura	...	...	...	...	...	
Rickets	2	8	3	10	1	

TABLE 1—(*cont.*)

RETURN OF DISEASES AND DEATHS (IN-PATIENTS) FOR THE YEAR 1924—(*cont.*)

Diseases.	Remaining in Hospital at the end of 1923.	Yearly total.		Total cases treated.	Remaining in Hospital at the end of 1924.	Remarks.
		Admissions.	Deaths.			
Scurvy	3	40	13	43	9	
Other general diseases	57	796	185	853	48	
Neuritis	11	192	5	203	16	
Meningitis	1	56	43	57	3	
Myelitis	8	19	7	27	2	
LOCAL DISEASES.						
Diseases of the nervous system—						
Sub-section 1—						
Hydrocephalus	...	4	2	4	...	
Encephalitis	...	...	...	...	...	
Abscess of brain	...	3	2	3	...	
Congestion of brain	...	9	5	9	...	
Other diseases of brain	6	77	33	83	6	
Sub-section 2—						
Apoplexy	...	19	8	19	1	
Paralysis	37	76	21	113	16	
Paraplegia	6	41	15	47	10	
Hemiplegia	18	92	12	110	26	
Epilepsy	6	101	10	107	6	
Neuralgia	3	172	...	175	2	
Hysteria	1	9	...	10	...	
Other nervous disorders	40	325	42	365	57	
Sub-section 3—						
Mental diseases—						
Idiocy	...	8	...	8	...	
Mania	...	93	...	93	1	
Melancholia	...	58	...	58	2	
Dementia	1	23	...	24	...	
Delusional insanity	...	110	...	110	1	
Other mental diseases	7	173	1	180	2	
Diseases of the eye—						
Conjunctivitis	59	455	...	514	59	
Keratitis	7	54	1	61	4	
Ulceration of cornea	15	170	1	185	18	
Iritis	3	63	...	66	14	
Optic neuritis	1	14	...	15	2	
Cataract	38	143	...	181	33	
Other eye diseases	48	441	9	489	71	
Diseases of the ear—						
Inflammation	2	53	2	55	1	
Other diseases	6	170	1	176	5	
Diseases of the nose	7	137	1	144	4	
Diseases of the circulatory system	1	17	5	18	...	
Pericarditis	...	20	14	20	...	
Endocarditis	...	20	14	20	1	
Valvular Mitral	19	281	99	300	11	
Aortic	4	27	13	31	1	
Tricuspid	...	1	1	1	...	
Pulmonary	...	...	...	...	...	
Arterial sclerosis	1	14	3	15	3	
Aneurism	3	30	12	33	...	
Other diseases of heart	4	124	47	128	5	

TABLE 1—(*cont.*)

RETURN OF DISEASES AND DEATHS (IN-PATIENTS) FOR THE YEAR 1924—(*cont.*).

Diseases.	Remaining in Hospital at the end of 1923.	Yearly total.		Total cases treated.	Remaining in Hospital at the end of 1924.	Remarks.
		Admissions.	Deaths.			
Diseases of the respiratory system	2	44	1	46	1	
Laryngitis	2	67	4	69	1	
Bronchitis	119	3,164	77	3,283	121	
Broncho-pneumonia	8	352	150	360	23	
Abscess of lung	...	4	3	4	...	
Gangrene of lung	...	43	40	43	1	
Empyema	4	46	23	50	3	
Emphysema	...	1	...	1	...	
Pleurisy	12	233	24	245	6	
Other diseases of the respiratory system	23	863	36	886	51	
Diseases of the digestive system—						
Stomatitis	5	118	8	123	7	
Caries of teeth	1	84	1	85	1	
Glossitis	...	6	1	6	...	
Sore throat	...	31	1	31	...	
Inflammation of tonsils	7	138	3	145	1	
Gastritis	12	450	5	462	10	
Ulceration of the stomach	2	48	19	50	4	
Hæmatemesis	...	1	1	1	...	
Dilatation of stomach	...	...	...	...	...	
Stricture of stomach	...	4	1	4	...	
Dyspepsia	15	405	1	420	13	
Enteritis	6	365	63	371	16	
Appendicitis	6	111	13	117	3	
Colitis	4	104	1	108	6	
Ulceration of the intestines	...	10	5	10	...	
Sprue	6	60	12	66	...	
Hernia	7	175	14	182	10	
Diarrhœa	49	1,304	94	1,353	43	
Constipation	5	814	...	819	10	
Colic	...	285	1	285	4	
Hæmorrhoids	6	215	1	221	6	
Intestinal obstruction	...	13	9	13	...	
Hepatitis—acute	5	130	8	135	3	
Abscess	2	55	10	57	5	
Cirrhosis	27	324	164	351	24	
Jaundice	4	127	14	131	6	
Peritonitis	2	83	71	85	1	
Ascites	4	56	13	60	3	
Other diseases of the digestive system	15	652	93	667	22	
Diseases of the lymphatic system	...	1	1	1	...	
Splenitis	1	115	7	116	6	
Inflammation of lymphatic gland	13	156	...	169	12	
Suppuration of lymphatic gland	16	245	...	261	11	
Lymphangitis	5	69	...	74	1	
Elephantiasis	1	2	...	3	...	
Other diseases of the lymphatic system	11	269	13	280	15	
Diseases of the urinary system—						
Acute nephiritis	40	525	189	565	22	
Bright's disease	18	365	114	383	27	
Pyelitis	...	4	2	4	...	
Renal colic	...	18	...	18	...	
Cystitis	1	53	3	54	4	
Vesical calculus	1	31	1	32	2	

TABLE 1—(*cont.*)

RETURN OF DISEASES AND DEATHS (IN-PATIENTS) FOR THE YEAR 1924—(*cont.*)

Diseases.	Remaining in Hospital at the end of 1923.	Yearly total.		Total cases treated.	Remaining in Hospital at the end of 1924.	Remarks.
		Admissions.	Deaths.			
Diseases of the urinary system—(*cont.*)						
Suppression	...	8	1	8	...	
Hæmaturia	...	6	...	6	...	
Chyluria	...	...	...	...	...	
Other diseases of the urinary system	8	158	20	166	3	
Diseases of the generative system—						
Male organs—						
Urethral fistula	...	16	1	16	1	
Phimosis	4	96	1	100	6	
Stricture	2	80	3	82	1	
Prostatitis	1	7	...	8	1	
Soft cancre	42	567	...	609	30	
Condyloma	...	3	...	3	2	
Inflammation of scrotum	1	17	3	18	...	
Hydrocele	1	77	...	78	3	
Orchitis	5	109	1	114	...	
Epididymitis	2	67	...	69	6	
Abscess of testicle	...	6	2	6	...	
Other diseases	10	252	11	262	17	
Female organs—						
Ovaritis	2	4	...	6	...	
Ovarian cyst	...	11	2	11	...	
Endometritis	3	30	...	33	1	
Displacement of uterus	...	15	...	15	...	
Vaginitis	...	20	...	20	3	
Amenorrhœa	...	10	...	10	...	
Dysmenorrhœa	4	31	...	35	...	
Menorrhagia	...	20	1	20	...	
Leucorrhœa	...	48	1	48	...	
Abortion	7	121	9	128	1	
Delayed labour	2	46	21	48	1	
Post-partum hæmorrhage	...	4	3	4	1	
Retained placenta	...	16	2	16	...	
Premature septicæmia	1	14	9	15	...	
Mastitis	...	3	...	3	...	
Abscess of breast	...	20	...	20	1	
Other diseases of female generative system	35	1,054	81	1,089	40	
Diseases of organs of locomotion—						
Osteitis	...	10	...	10	1	
Arthritis	16	393	7	409	25	
Spondylitis	1	...	...	1	...	
Bursitis	...	...	...	...	...	
Other diseases	31	577	11	608	28	
Diseases of connective tissue	2	23	1	25	3	
Cellulitis	42	544	61	586	45	
Abscess	90	1,718	22	1,808	84	
Elephantiasis	1	13	...	14	1	
Other diseases	8	220	11	228	13	
Diseases of the skin—						
Urticaria	1	28	...	29	...	
Eczema	17	390	...	407	16	
Boil	8	127	...	135	4	
Carbuncle	4	71	3	75	4	

TABLE 1—(*cont.*)

RETURN OF DISEASES AND DEATHS (IN-PATIENTS) FOR THE YEAR 1924—(*cont.*).

Diseases.	Remaining in Hospital at the end of 1923.	Yearly total.		Total cases treated.	Remaining in Hospital at the end of 1924.	Remarks.
		Admissions.	Deaths.			
Diseases of the skin—(*cont.*)						
Herpes	3	132	...	135	2	
Psoriasis	...	5	...	5	1	
Oriental sore	49	557	13	606	46	
Tinea	1	79	...	80	2	
Scabies	38	983	...	1,021	25	
Acne	...	2	...	2	...	
Prickly heat	...	...	...	...	...	
Other diseases of the skin	276	3,463	47	3,739	260	
Injuries—						
General	32	537	18	569	13	
Local	182	5,891	161	6,073	303	
Surgical operations, Major	108 *	...	...	...	...	
,, ,, Minor	1,391 *	...	...	...	...	
Tumours	13	253	66	266	12	
Malformations	20	15	3	35	20	
Poisons	2	82	7	84	2	
Other diseases	2	16	3	18	1	
Parasites—						
Animal	...	30	1	30	1	
Protozoa	...	...	...	...	...	
Trematoda (flukes)	...	...	...	...	...	
Cestoda	...	2	...	2	...	
Tænia solium	...	9	...	9	...	
Tænia saginata	...	12	...	12	1	
Menatoda	...	5	...	5	...	
Ascaris	71	2,745	23	2,816	77	
Tricocephalus dispar	...	6	...	6	...	
Trichina	...	...	...	...	...	
Dracunculus	...	...	...	...	...	
Filariasis	...	2	...	2	...	
Strongylus	...	...	...	...	...	
Ankylostomiasis	141	3,193	204	3,334	149	
Oxyuris	...	2	...	2	...	
Others	1	43	2	44	1	
Insecta	...	...	...	...	...	
Myiasis	...	...	...	...	...	
No discoverable diseases and under observation	128	4,607	7	4,735	205	
Dysentery, chronic	...	3	2	3	...	
Gonorrhoeal rheumatism	11	99	...	110	5	
,, conjunctivitis	1	1	...	2	...	
Melioidosis	...	2	2	2	...	
Mumps	...	11	...	11	1	
Pyaemia	...	1	1	1	...	
Puerperal septicaemia	...	63	21	63	...	
Premature birth	...	15	15	15	...	
Ulcers	28	495	7	523	32	
Insect bite	...	1	...	1	...	
Dependants	...	22	...	22	...	
Normal labour	28	566	6	594	24	
Difficult labour	1	1	...	2	...	
Pregnancy	...	80	...	80	...	
Total	4,171	86,500	6,751	90,671	4,611	

*Not included in total.

TABLE 2.

MEDICAL STAFF AT 31ST DECEMBER, 1924.

1 Principal Medical Officer
4 Senior Medical Officers
2 Chief Surgeons
1 Ophthalmic Surgeon
25 Medical Officers (5 acting as Health Officers)
7 Lady Medical Officers (including 1 working under Infant Welfare Centre)
1 Personal Assistant to the Principal Medical Officer, Federated Malay States
1 Financial Secretary
1 Deputy Medical Officer
19 Assistant Medical Officers
39 Assistant Surgeons
20 Dressers, Special Grade
62 Dressers, Grade I
211 Dressers, Grade II
165 Dressers, Grade III
78 Dressers, Probationers
3 Matrons, Grade I
4 Matrons, Grade II
33 European Sisters
52 Asiatic Nurses
16 Native Midwives.

HEALTH BRANCH.

1 Senior Health Officer
6 Health Officers
2 Chief Sanitary Inspectors
4 Assistant Surgeons
5 Health Inspectors, Grade I
22 Health Inspectors, Grade II
1 Probationer Health Inspector
1 Malaria Inspector.

INSTITUTE FOR MEDICAL RESEARCH.

1 Director
1 Bacteriologist
1 Pathologist
1 Assistant Pathologist
1 Chemist
2 Assistant Chemists
2 Malaria Research Officers
1 Librarian
1 Laboratory Assistant, Grade I
3 Laboratory Assistants, Grade II
3 Laboratory Assistants, Grade III
4 Laboratory Assistants, Probationers.

CENTRAL MENTAL HOSPITAL.

1 Medical Superintendent
1 Assistant Medical Superintendent
1 Senior Assistant Physician
1 Assistant Physician
1 Second Assistant Physician
1 Inspector
1 Assistant Inspector
1 Dresser, Grade II
2 Dressers, Grade III
1 Matron
2 Nurses
1 Work Mistress
1 Steward
1 Storekeeper.

VETERINARY BRANCH.

5 Veterinary Surgeons
1 Assistant Veterinary Surgeon
11 Veterinary Inspectors
6 Veterinary Assistants.

ANNUAL REPORT OF THE INSTITUTE FOR MEDICAL RESEARCH FOR THE YEAR 1924.

PASTEUR INSTITUTE.

A new department of the Institute for the prophylactic treatment of rabies was opened on August 1st in the charge of Dr. A. Neave Kingsbury. Earlier in the year Dr. Kingsbury spent some weeks in a study of the methods employed at the Pasteur Institutes of Colombo, Ceylon, and in Coonoor, South India.

Two strains of rabies virus were obtained. One of these came originally from Paris via Kasauli, the other was a local strain which had been "fixed" in Colombo and was then in its 267th passage. The viruses were transported in a thermos flask, packed in ice, and on arrival both caused symptoms of rabies in rabbits seven days after intra-cerebral inoculation. A few passages here brought about a slight decrease in the incubation period and both strains now usually render rabbits moribund in six and a half days.

Carbolised vaccine containing one per cent. of nerve tissue in 0.5 per cent. carbol saline is employed for the treatment of human cases. A prophylactic vaccine is also prepared for dogs, so that they may be protected in the presence of an outbreak of rabies. The strength adopted for the dog vaccine is a 20 per cent. emulsion of nerve tissue in glycerin phenol solution. (Umeno, Vet & Doi).

Instead of the usual method of grinding nerve tissue with pestle and mortar, the material is forced through very fine wire gauze by means of a press similar in design to that employed in Colombo. A good emulsion is obtainable by this method and risk of contamination by micro-organisms from the air is reduced to a minimum.

Passage of both strains is carried out monthly and the vaccine made from the material so obtained is pooled. Carbolised vaccine is known to improve in immunising power after two months storage on ice but deteriorates slightly after three months. The vaccine for human cases is therefore stored for three months only. With average yields of nerve material, a stock of vaccine sufficient for 36 human cases and 24 dogs is available at any moment for dealing with an outbreak.

It has been decided to issue the vaccine to Government hospitals if an epidemic should occur, and a bulletin has been prepared on the diagnosis and prophylactic treatment of rabies. Details are given therein of the administration of the vaccine and for the care of patients during their course, so that medical officers will be in a position to undertake treatment.

Since the opening of the Department 14 patients have been treated, six Europeans, one Eurasian, two Malays, one Chinese and four Tamils. No fatality has occurred. The small number of cases is due to the fact that rabies, though present, has not been prevalent during the year.

Brains from ten dogs and one cat have been submitted for examination and in one case only—a dog from Malacca—was rabies diagnosed.

TROPICAL TYPHUS FEVER.

Dr. W. Fletcher, Bacteriologist, and Mr. J. E. Lesslar, Assistant Pathologist, during the latter part of the year made a special study of cases of fever of obscure origin occurring in Malaya and furnish the following summary of the results of their investigations. Further details will be given in a forthcoming number of the series "Bulletins from the Institute for Medical Research".

There is a sort of typhus which differs essentially from the ordinary type, by reason of its low infectivity. It does not pass direct from one person to another. There is no evidence that it is carried by lice. Megaw has drawn attention to a sporadic and localised form of typhus in the Kumaon district of the Himalayas, which he considers is probably carried by ticks. Yersin and Vassal saw non-infectious cases in Indo-China during 1908. Smithson investigated a similar outbreak in the sugar-cane fields of Queensland in 1910. In 1922, Maxy and Havers saw 13 cases of the same kind of fever in Alabama. There was no evidence of louse infestation in these cases; the Weil-Felix reaction was positive. In 1923, Hone reported the occurrence of a typhus-like disease in and around Adelaide; the Weil-Felix reaction was positive and the disease resembled typhus in every way except that it did not spread from man to man and there was no evidence that it was carried by lice.

A similar disease occurs in the Malay States and we call it "Tropical Typhus" because it appears to be more common in the tropics than the epidemic form: we do not mean to imply that it occurs nowhere else.

Kuala Lumpur, the capital of the Federated Malay States, is only four degrees north of the equator; the mean temperature is about 84° F. and there is no appreciable seasonal variation. Typhus had never been recognised in the country until recently.

Between August, 1924, and January, 1925, eighteen cases have been diagnosed as typhus: thirteen in the State of Selangor, three in the State of Negri Sembilan, one in Perak and one in Pahang. In most cases the disease was not discovered until a blood specimen was examined, which had been sent to the laboratory because the patient had typhoid symptoms.

At about the time when the earlier cases were recognised, several persons were admitted to hospital in Kuala Lumpur with high fever and died shortly afterwards. The cause of death was not discovered; typhus was not suspected. The blood of a patient with similar symptoms, taken ill subsequently, agglutinated X.19 in a dilution of 1 in 120, on the day of his death.

The general features of the disease are similar to those of typhus in other parts of the world. Eight of the eighteen cases were mild, five were moderately severe, five were severe. None were fatal, but two were so ill that the prognosis appeared to be hopeless.

The incubation period was less than 12 days in one instance; in another, it was as long as three weeks. The onset is sudden with fever, rigors, headache, sneezing, catarrh and bronchitis, symptoms in short resembling those of influenza. The illness develops rapidly and, in a case of moderate severity, the condition of the patient at the end of the first week is like that in the third week of typhoid fever. The fever is at its height from the eighth to the eleventh day. The temperature is about 104° F., the pulse 120, and the respiration between 30 and 40. There is usually a sudden and dramatic change for the better at the end of the second week. Six cases ended by crisis, six by quick lysis and six by lysis. The fever was prolonged by broncho-pneumonia or septic complications in three.

Thirteen of the patients suffered from bronchitis, eight were delirious. The knee-jerks were lost in six, during the second week. There was deafness in eight. The spleen was enlarged in seven. There was glandular enlargement in ten.

There was a rash, or traces of one were found, in twelve of the eighteen patients, but it was profuse and conspicuous in only one instance. The eruption, in the Asiatic patients, was usually limited to a few purpuric patches which would have escaped observation unless they had been carefully looked for. In one of the Europeans the rash resembled the rose-spots of typhoid so closely that a diagnosis of typhoid fever was made on the strength of them.

The Weil-Felix reaction was positive in all. The end titre was between four hundred and a thousand in four, over a thousand in fourteen. In some the reaction was positive as early as the seventh day; but in at least five cases, it did not appear until the end of the second week or later. The titre increased up to the beginning of the fourth week and then declined. One patient, examined two months after the attack, gave a negative reaction; but in another, there was a definitely positive reaction six months after the beginning of her illness. We employed, for the test, an emulsion of living organisms given to us by Dr. A. Neave Kingsbury, which had been obtained from the Lister Institute in 1921. A dilution of 1 in 200 was taken as the limit above which the reaction was regarded as positive. Repeated tests were made in each case; the evidence of a waxing and waning titre obtained in this way, is cogent proof of active disease.

Control tests were made with the blood of 365 healthy persons and hospital patients. *B. proteus* X. 19 was not agglutinated at a titre above 1 in 30 in 359 cases; it was agglutinated at 1 in 60 in four and at 1 in 120 in two. There was some evidence that the last two cases had suffered from typhus.

Ehrlich's diazo reaction is usually present during the fever, but disappears soon after defervescence.

Marris's atropine test was negative in two cases where it was applied during the second week.

The results of the inoculation of patient's blood into guinea-pigs were nearly all negative; probably because we were unable to obtain samples before the tenth day of disease. A febrile reaction was obtained in the animals inoculated with blood from two cases and the virus is being maintained by the inoculation of the brains of these animals.

The typhus of Malaya does not spread directly from man to man. It does not spread in the household where a case occurs, and it does not spread in the hospitals where patients have been treated in the general wards. The six Europeans who contracted typhus in a military camp were all sleeping in different four-men tents which were not near to each other.

Some of the towns in Malaya are very densely populated, but none of the patients came from these crowded areas; on the contrary nearly all of them lived, or worked, in uncultivated open country. The disease, like tsutsugamushi and the spotted-fever of the Rocky Mountains, appears to be associated with limited areas of uncultivated land. The military camp, to which we have referred, was situated in open country which is used as a grazing ground for cattle. In addition to the soldiers, who contracted typhus there, three native cow-keepers, who pastured their cattle on the site of the camp, were taken ill with the disease soon after the soldiers had left the district.

One of the most striking features of the Malayan fever is its race incidence. The population consists of Malays, Chinese and Tamils; the numbers of other nations are comparatively insignificant. Punjabis constituted less than 1 per cent. of the population at the last census and Europeans were less than 0.5 per cent.; yet seven of the typhus patients were Europeans, seven were Punjabis, only four were Tamils and there were no Malays or Chinese. The number of Europeans is accounted for, by the association of six of them with the same source of infection in the military camp. All the Punjabis were cattle-keepers. There were no cases of the disease among Punjabi police and those engaged in other occupations. The same association of the disease with cattle was evident in the Tamils also; three of the four Tamil patients were cow-keepers.

Several medical men, with long experience of Malaya, consider that it is a disease new to the country. It is already widely distributed and cases have occurred in each of the four Federated States. Possibly the infection is conveyed from place to place by cattle.

No body-lice were found on any of the patients and the Europeans were entirely free from head-lice. The evidence of the epidemiology is sufficiently strong to exclude the possibility of lice being the vectors. No small ulcers, such as follow the bites of the infected mites in tsutsugamushi disease, could be found in any of the patients. Megaw has brought forward evidence which incriminates ticks as the carriers of the virus in Himalayan typhus and possibly the etiology of the disease in the Malay States can be explained in the same way. The close association of nearly all the Asiatic patients with cattle and the fact that the majority of the Europeans had been camping in a place which is used as a grazing ground are arguments in favour of ticks as vectors of the disease.

In places where there are cattle there are usually rats; the site of the military camp is notorious for its rats. It is suggested that, as in tsutsugamushi disease and spotted fever, the rats act as reservoirs of the virus and as hosts of the larval ticks; while the adult ticks are conveyed from one place to another by cattle, which themselves are probably immune.

OTHER INVESTIGATIONS.

The subject of melioidosis was further studied during the year and the detailed results have been embodied in a series of papers in *The Lancet* and *Journal of Hygiene*. The causative agent of the disease, *B. whitmori*, and the effects of animal inoculation were studied at the Lister Institute, London, in confirmation of the results obtained here.

Dr. A. Neave Kingsbury studied the effects of tropical temperatures on the stability of Insulin and has recorded the details of the first stage of his investigation in a paper in *The Lancet*.

An investigation is in progress into the question of diphtheria in Malaya, the virulence or otherwise of the organisms, the occurrence of carriers, and by means of the Schick test the susceptibility to the disease of the different nationalities represented locally.

Similarly in regard to typhoid fever reported cases are being further examined with the object of determining more exactly the incidence of the disease and the factors favouring its spread in Malaya.

Dr. Fletcher continued his work on behalf of the Cinchona Derivatives Committee of the Medical Research Council and has reported to the Committee the results of treatment in malaria with quinine bisulphate and quinidine bisulphate. A question having arisen as to the efficacy of cinchona febrifuge, the Principal Medical Officer courteously arranged that supplies of the product in use in the different States should be sent to Dr. Fletcher for trial and analysis. On completion of this work the results obtained will form the subject of a special report.

It is gratifying to observe the renewed interest throughout the world in the efficient treatment of diseases such as malaria and leprosy, as a most important element in their control.

MORBID HISTOLOGY.

During the year 193 specimens of tissues have been examined for diagnosis or in connexion with various investigations which are proceeding. Frozen sections have been prepared from all specimens submitted by surgeons so that reports on such cases can be completed without delay.

In tables I and II particulars are given of the benign and malignant tumour cases on which histological examination has been made. The tables are based on the information supplied with the specimens, which unfortunately is meagre in some instances.

Among the cases of benign tumours No. 6 is of interest as the first case of blastomycosis noted here. The patient was a Chinese boy aged 17 years, who had had a "boil" for about six months near the umbilicus and a granulomatous tumour developed later on the same site. Sections showed a mass of granulation tissue with some papillary downgrowths from the epidermis. Scattered throughout the section were numerous yeast cells, many of which showed budding, and the tissue was infiltrated with polymorphonuclear and eosinophil cells. Culture of the organism was impracticable as the tissue was received in formalin solution.

From the table of the malignant cases, it will be seen that the ratio of the numbers of Malays, Chinese and Tamils affected is as 1 : 6 : 3. The ratio of the numbers of these nationalities admitted to hospital during the year was as 1 : 4.14 : 7.5. Sufficient information is not available to allow of the arrangement of the admissions to hospitals into age groups for different nationalities, but it can be stated that more Chinese than Tamils in the later decennia are admitted; the Tamil usually returns to India when he has saved a competency. It is advisable to point out that natives frequently have little idea of their age, and therefore the ages given are approximate only. Also any comparison regarding sex incidence is invalid because few native women seek medical advice.

There were three definite and two probable cases of carcinoma of the intestine, all among Chinese. The autopsy on case No. 18 was of interest as a chronic gastric ulcer was found to have undergone malignant change. Deposits of growth were found in the liver and appendix, both of which organs contained a few ova of *S. japonicum*.

One case of primary carcinoma of the liver (No. 13) was diagnosed. Intense multilobular cirrhosis had occurred in the non-infiltrated areas, but a prolonged search of sections for evidence of trematode infection had negative results.

A case of carcinoma of the male breast and three cases of carcinoma of the penis are included in the series. Of the latter, two cases were Chinese and one Tamil. In all three the condition was far advanced when the cases came under observation so that the initial position of the lesion cannot be recorded.

Parotid tumours were submitted for diagnosis from three patients. One case (No. 17) came to autopsy and secondary deposits were found in the liver.

Case No. 39 had had an extensive burn on the back and the epithelioma developed in the scar about 20 years after the original injury.

Two cerebral tumours were examined from Chinese patients. Sections from both cases showed a papillomatous arrangement of several layers of cells on a vascular axis. They were diagnosed as ependymal gliomata.

TABLE I.

BENIGN TUMOURS.

Case No.	Nationality.	Sex.	Age.	Position of tumour.	Diagnosis.
1	European ...	M.	65	Left leg (subcutaneous) ...	Fibroma
2	Malay ...	M.	38	„ „ ...	Sebaceous cyst
3	„ ...	F.	39	Uterus	Fibromyomata
4	Chinese ...	F.	12	Mandible	Epithelial odontome
5	„ ...	M.	17	Left upper eyelid (subcutaneous)	Fibroma
6	„ ...	M.	17	Anterior abdominal wall (cutaneous)	Blastomycosis
7	„ ...	M.	40	Outer canthus, left eye (subcutaneous)	Fibroma
8	„ ...	M.	—	Multiple nodules (subcutaneous)	Molluscum fibrosum
9	Tamil ...	F.	2	Neck	Thyroglossal cyst
10	„ ...	F.	32	Uterus	Hydatidiform mole

TABLE II.

MALIGNANT TUMOURS.

Case No.	Nationality.	Sex.	Age.	Position of tumour.	Diagnosis.
1	European ...	M.	65	Ulcer—nose	Rodent ulcer
2	,, ...	M.	—	,, ,, ...	,,
3	Malay ...	M.	19	Parotid	Cylindroma
4	,, ...	M.	32	Ulcer—right leg	Epithelioma
5	,, ...	M.	35	Fungating growth above right iliac crest	,,
6	,, ...	M.	40	Thyroid gland	Carcinoma
7	Chinese ...	M.	24	Lobe of right ear	Epithelioma
8	,, ...	M.	29	Fungating growth of penis	,,
9	,, ...	M.	31	Sacrum, bladder and sigmoid colon	Large round-celled sarcoma
10	,, ...	M.	38	Fungating growth of penis	Epithelioma
11	,, ...	M.	39	Cerebral tumour	Ependymal glioma
12	,, ...	F.	40	Orbit	Endothelioma
13	,, ...	M.	46	Liver	Primary carcinoma
14	,, ...	M.	47	,, ...	Secondary carcinomatous deposits
15	,, ...	M.	48	Descending colon	Carcinoma
16	,, ...	M.	48	Glands of neck	Secondary epitheliomatous deposits
17	,, ...	M.	51	Parotid	Parotid tumour
18	,, ...	M.	51	Stomach, appendix and liver	Carcinoma
19	,, ...	F.	52	Cervix uteri	Epithelioma
20	,, ...	M.	53	Right breast	Carcinoma
21	,, ...	M.	56	Rectum	,,
22	,, ...	M.	68	Lung	Endothelioma
23	,, ...	M.	70	Glands of neck	Secondary epitheliomatous deposits
24	,, ...	M.	80	Parotid	Parotid tumour
25	,, ...	M.	—	Lung	Small round-celled sarcoma
26	,, ...	M.	—	Glands of neck	Secondary epitheliomatous deposits
27	,, ...	M.	—	Cerebral tumour	Ependymal glioma
28	,, ...	M.	—	Liver and spleen	Secondary carcinomatous deposits
29	,, ...	M.	—	Spleen, pancreas, large and small intestine with glands in mesentry axillae and groins	Lymphosarcoma
30	,, ...	M.	—	Right pectoral muscle ...	Alveolar carcinoma
31	Tamil ...	M.	10	Naso-pharynx	Round-celled sarcoma
32	,, ...	M.	10	Small intestine and mesenteric glands	Lymphosarcoma
33	,, ...	M.	27	Fungating growth of penis	Epithelioma
34	,, ...	M.	27	Pancreas and liver ...	Carcinoma of pancreas
35	,, ...	M.	30	Occipital region	Large round-celled sarcoma
36	,, ...	M.	30	Spleen, stomach, pancreas, left kidney and transverse colon	Small round-celled sarcoma
37	,, ...	M.	30	Spleen and mesenteric glands	Lymphosarcoma
38	,, ...	M.	50	Anterior pillar of fauces ...	Epithelioma
39	,, ...	M.	—	Fungating growth—posterior thoracic wall ...	,,
40	,, ...	M.	—	Posterior pharyngeal wall...	Carcinoma
41	,, ...	M.	—	Lower lip	Epithelioma
42	,, ...	M.	—	Angle of mouth	,,

VENEREAL DISEASES.

The number of blood specimens received for examination by the Wassermann test for syphilis was 5,524; of these 4,973 were examined, the remainder being for one reason or another unsuitable. A positive result was obtained in 2,005 cases.

A comparison of the results of Kahn's test and the Wassermann test in 730 specimens resulted as follows:

Kahn's Test.		Wassermann Test. (1) Weak positive.	(2) Positive.	(3) Negative.
(1) Weak positive	35	7	13	15
(2) Positive	230	5	187	38
(3) Negative	418	17	7	394

Percentage of agreement (1), (2) and (3) 88.72

,, ,, ,, (1) and (2) 80.0

,, ,, ,, (3) 94.25

Of 47 specimens which were anti-complementary by the Wassermann test, 51 per cent. were positive and 49 per cent. negative by Khan's test.

Sixteen specimens were examined by the direct method for *Spirochaeta pallida* with a positive result in six cases. Eighteen specimens were examined for gonococci in special cases with a positive result in eight.

ENTERIC FEVERS.

Six hundred and seventy-six specimens of blood were examined by the agglutination reaction; 199 gave a positive result with *B. typhosus*, none with *B. paratyphosus A.* and ten with *B. paratyphosus B.*

One hundred and thirty-seven specimens of faeces were examined by bacteriological methods for the presence of organisms of the enteric group. *B. typhosus* was identified in 14 specimens and *B. paratyphosus A.* in one.

Seventy-eight specimens of urine from cases of enteric fever were similarly examined and *B. typhosus* was identified in four of them.

PLAGUE.

No case of plague was reported.

Two hundred and eighty-four rats taken in the Kuala Lumpur Sanitary Board area were examined for *B. pestis* with negative results.

CHOLERA.

A serious outbreak of cholera occurred amongst immigrants in the Quarantine Camp at Port Swettenham during the months of May and June. In connexion with this outbreak and from sporadic cases which occurred in the Krian district about the same time, 159 specimens were examined for purposes of diagnosis; in 131 of these the vibrio of Asiatic cholera was identified.

Two hundred and fifty specimens from convalescents were examined to ensure that none were carriers of vibrios on their release from quarantine.

An outbreak of a cholera-like disease on a Selangor estate was investigated and attributed to *B. pseudocholerae* of van Loghem.

CEREBRO-SPINAL FEVER.

Forty-seven specimens of cerebro-spinal fluid were received for examination. In seven of these the *meningococcus* was identified, in nine the *pneumococcus*, in one *staphylococcus*, in three *B. tuberculosis*, and in one *B. influenzae*.

DIPHTHERIA.

Diphtheria was prevalent throughout the year. Six hundred and twenty-nine throat swabs were received for examination by culture. In seventy-seven of these *B. diphtheriae* was identified. In two cases the characteristic spirochaetes and fusiform bacilli of Vincent's Angina were found in smears.

DYSENTERY.

Two hundred and twenty-six specimens of faeces from cases of supposed dysentery were examined by bacteriological and microscopic methods. The results were as follows:

B. dysenteriae, Flexner	61
B. dysenteriae, Shiga	1
Entamoeba histolytica	15
B. typhosus	3
Negative	146
Total ...	226

Thirty-eight specimens taken at post-mortem examinations were similarly examined with results as follows:

B. dysenteriae, Flexner	14
B. dysenteriae, Shiga	1
Entamoeba histolytica	3
Negative	20
Total ...	38

Three hundred and forty-seven tubes of anti-dysentery serum were issued for use in treatment.

LEPROSY.

Seventy-seven specimens, smears of nasal discharge and exudate from leprous nodules, were examined. *B. leprae* was identified in 39. Most of these specimens were examined in connection with Dr. Travers's investigations in treatment of the disease at the Leper Asylum, Kuala Lumpur.

MEDICO-LEGAL.

Seventeen specimens of blood stains were examined by the precipitin test for human blood; of these, fourteen gave a positive result.

Other specimens examined for medico-legal purposes included blood for the Wassermann test, smears for gonococci and various articles of wearing apparel for seminal stains.

MISCELLANEOUS.

There were 5,843 miscellaneous examinations: blood films for malaria parasites in special cases, sputum for the tubercle bacillus, faeces for ova, urine for quantitative estimation of glucose, urine for the presence of quinine, and other clinical laboratory tests.

Autogenous vaccines were prepared in 54 cases.

CHEMICAL LABORATORIES AND MALARIA BUREAU.

Reports on the work of the Chemical Laboratories by Mr. R. W. Blair, Chemist-in-Charge, and on the work of the Malaria Bureau by Captain K. B. Williamson, Malaria Research Officer, are appended.

PUBLICATIONS.

The following publications were issued from the Institute during the year:

(*a*) *Studies from the Institute for Medical Research:*

No. 17. "Collected Papers on Beriberi," by A. T. Stanton and H. Fraser.

No. 18. "Notes on the Treatment of Malaria," by W. Fletcher.

No. 19. "Dysentery in the Federated Malay States," by W. Fletcher and M. W. Jepps.

(*b*) *Bulletins from the Institute for Medical Research, 1924:*

This is a new series of publications in which will be included shorter articles and progress reports of investigations which on completion may form the basis of a monograph or study. It is proposed to include in these bulletins the details of investigations which have hitherto been recorded in the annual reports but which do not suitably find a place there.

Authorship of the bulletins is not confined to members of the staff of the Institute and during the year Professor F. G. Haughwout of the Bureau of Science, Manila, very kindly undertook the preparation of an account of the microscopic diagnosis of dysentery.

No. 1. "Rectal Injections of Quinine," by W. Fletcher.

No. 2. "Concerning Rabies and Pasteur Treatment," by A. N. Kingsbury.

No. 3. "The Practical Microscopic Diagnosis of Dysentery," by F. G. Haughwout.

No. 4. "Beriberi and Rice Control in Malaya," by C. E. Cobb.

No. 5. "Melioidosis, a Disease of Rodents communicable to Man," by A. T. Stanton and W. Fletcher.

(*c*) *Other Papers:*

"Cases of Human Melioidosis," by A. T. Stanton, W. Fletcher and K. Kanagarayer. *Journal of Hygiene.*

"Melioidosis," by A. T. Stanton and W. Fletcher. *The Lancet.*

"A Case of Typhoid Septicaemia," by W. Fletcher and J. E. Lesslar. *Indian Medical Gazette.*

"The Alleged Deterioration of Insulin in the Tropics," by A. N. Kingsbury. *The Lancet.*

STAFF CHANGES.

Dr. A. Neave Kingsbury was appointed Pathologist and assumed duty on 14th April.

Dr. H. P. Hacker, Malaria Research Officer, proceeded on leave on 24th April.

Captain H. M. Pendlebury acted as Malaria Research Officer from 25th April to 24th September.

Captain K. B. Williamson was appointed Malaria Research Officer and assumed duty on 25th September.

Mr. R. W. Blair, Chemist, returned from leave on 22nd July.

Mr. J. Shelton, Assistant Chemist, proceeded on leave on 2nd August.

Mr. K. Kanagarayer, Assistant Surgeon, was transferred to the Institute on 1st September.

A. T. STANTON,
Director of Government Laboratories,
Federated Malay States.

19th February, 1925.

ANNUAL REPORT OF THE MALARIA BUREAU, INSTITUTE FOR MEDICAL RESEARCH, FEDERATED MALAY STATES, FOR THE YEAR 1924.

Dr. H. P. Hacker, the first Malaria Research Officer, who was in charge of the Bureau, was invalided home during April, and I assumed duty as second Malaria Research Officer on 24th September. During the intervening period the Bureau was under the charge of Captain Pendlebury of the Museum.

STAFF.

Two of the staff were transferred to the Health Department, Penang; one, Inche Mohamed, Head Collector, from 16th May, and the other, Mr. S. Ampalavanar, Laboratory Assistant, from 21st June. In addition two collectors left the service during the year.

FIGURES RELATING TO FIELD AND LABORATORY WORK.

The following figures show the amount of material collected and dealt with in the Laboratory.

Breeding places described	992
Larvae identified microscopically	33,903
Adults bred out and identified	10,075
Adults caught in houses	1,595

SABAK BERNAM.

The investigation into the cause of an outbreak of malaria in this place, referred to in the last annual report, was completed; but the detailed report on the expedition is unavoidably delayed owing to the fact of Dr. Hacker's absence.

WORK AT KENT ESTATE.

The continuous observations on the seasonal prevalence of species of anophelines, in progress since September, 1921, with the help and consent of the estate authorities, were completed, and the detailed report containing full data will be prepared as soon as Dr. Hacker returns.

PULAU JEREJAK.

A second survey of mosquito-breeding places was undertaken in accordance with the instructions of the Principal Medical Officer, Federated Malay States, with special reference to the neighbourhood of the site selected for the extension of the leper hospital. A previous survey of breeding waters had been made by Dr. Hacker in January, 1922. This happened to fall in a spell of particularly dry weather. *A. maculatus*, though found breeding only in small numbers, was the predominant species.

The second survey was also made in somewhat dry weather, but seepage was fairly abundant, and 1,995 larvae of *A. maculatus* were collected, compared with a total of only 125 larvae of other species, viz., *A. barbirostris*, *A. hyrcanus*, *A. fuliginosus* and *A. leucosphyrus*. The predominance of *A. maculatus* was therefore fully confirmed.

The results of the above two surveys led to the conclusion that the newly chosen sites will be drier than the present ones, and anopheline breeding therefore more easy to control.

"PARIS GREEN."

Some preliminary experiments on the use of "Paris Green" as a larvicide were made both in Laboratory and field, the results of which were on the whole in accordance with anticipation. The pupae of neither anopheline nor culicine mosquitoes were affected by "Paris Green", whether applied as a film on the surface of water, or as a heavy suspension, but the larvae of both were easily destroyed. An interesting and unexpected observation however was that the filtrate from a suspension of "Paris Green" is decidedly toxic to larvae, a soluble poison evidently being present. These experiments were carried out by Mr. S. Ampalavanar.

TYPE COLLECTION.

The main work of the staff during the middle part of the year was to add to the type collection. Larvae, pupae and adults, as well as larval and pupal skins of different species of anophelines, were preserved for study and distribution.

Type collections illustrating the commoner species of anophelines have been sent to:

Dr. A. T. Stanton, Kuala Lumpur.
Dr. E. H. Black, Kuala Lumpur.
Dr. E. T. McIntyre, Kuala Lumpur.
Dr. W. T. Moir, Klang.
Dr. A. Hunter, Singapore.
Dr. F. R. Sayers, Penang.
Dr. D. Bridges, Kedah.
Dr. James J. Keirans, Ireland.
Major W. A. Frost, Singapore.
Major Cunningham, Madras.
Col. Bisset, Rangoon.
Capt. A. D. Gammans, Port Dickson.
Mr. A. R. Gater, Kuala Lumpur.

Among these type sets have been included series of larvae and adults mounted as microscopical specimens. Since the preparation of microscope slides for distribution makes heavy demands upon time, this has only been possible owing to the cessation of active research work in the interval following Dr. Hacker's departure. Named larvae are at present being supplied to enquirers preserved in four per cent. formalin in corked specimen tubes. This procedure has the advantage of allowing the larvae to be dissected, or mounted, in any way desired by the recipients, and moreover nearly preserves the natural appearance of the live larvae.

GENERAL.

A demonstration of living and mounted specimens of mosquitoes was prepared for the Malaria Advisory Board's stalls at the Agri-Horticultural Society's Show held at Kuala Lumpur in July, and at Kuala Langat in October. There have been a number of medical visitors to the Bureau; but, being in an out of the way spot, it is neglected by the general public, and the health exhibits would probably be more instructive if they were housed in, or near to, the Town Museum.

Thirteen reports have been made upon insects, mainly collections of mosquitoes or of their larvae, sent for identification. Reports have also from time to time been made, verbally or by letter, upon other *nematocera* suspected of sucking blood, and liable to be mistaken for mosquitoes. A number of enquiries from Health Officers and others, both from within the Federated Malay States and elsewhere, on matters relating to malarial control, have also been dealt with. The Bureau in this respect functions as an information Bureau, and is called upon to answer enquiries received from various parts of the world. It is therefore important that its library, the deficiencies of which have been reported by Dr. Hacker, should be kept up-to-date and provided with works of reference. It requires to be greatly augmented both on the entomological side, and by the inclusion of monographs and reference books required for laboratory work in connection with the chemical, bacteriological, algological and other investigations now being carried on. To a certain extent the other scientific libraries in the town, including that of the Institute for Medical Research, enable the required information to be obtained, but incompletely; and their distance from the Bureau, and the fact that the books in them can only exceptionally be borrowed, is a drawback. Owing to Dr. Hacker's absence, apart from current numbers of journals, no additions have been made to the Bureau's library, and only the barest needs in the way of renewal of perishable laboratory equipment have been met in the current year, which ended with an unexpended balance of $7,997. It is therefore anticipated that heavier expenditure than usual will be necessary in the ensuing year in order to make up these deficiencies, and a supplementary grant may not improbably be necessary.

Two extended tours made, one with the Principal Medical Officer, and the other with the Senior Health Officer, have afforded me the privilege of profiting from their wide experience of the health problems, particularly malarial control, in the Federated Malay States.

The intervening time has been occupied in brief independent tours, including a preliminary survey of the fields in Krian and some other rice growing districts, and in making preparations for the experimental investigations in rice fields, shortly to be commenced.

A preliminary and so far incomplete survey has been made of the reaction of mosquito-breeding waters, with a view to testing MacGregor's thesis that the degree of their alkalinity or acidity is a main factor determining the species of larvae found in them. The work has been rendered possible by the courtesy of Mr. Blair and Dr. Fletcher of the Institute for Medical Research, in supplementing the supply of indicators brought out from England, and in lending me standard p.H tubes.

It would appear from the observations so far made that species breeding in cleared jungle, such as *A. maculatus*, *A. karwari* and *A. tessellatus* have a preference for acid water with a p.H range from below 5.5 up to about 6.6, seepage water in which they occur being much more acid than that of streams in which they breed, which usually have a p.H up to about 6.6. On the other hand the larvae of species such as *A. barbirostris*, *A. kochi*, *A. sinensis*, *A. fuliginosus*, etc., which breed in marshes, rice fields and ponds, have been found in water with a p.H range from about 6.4 to just over 8.0, but most commonly in slightly acid water with a p.H just less than that of the neutral point, 7. The water in most of the rice fields in Perak, including those in Krian, and of some tested in Selangor, was found to be acid. But a few rice fields containing alkaline water with a p.H of about 7.8 were found near Kuala Pilah in Negri Sembilan. One of these fields yielded larvae of *A. aconitus*. This species is also widely distributed in marsh land containing acidic water, but its occurrence in these fields is of interest, since Sir Malcolm Watson states that they are malarious, and further since he considers that *A. aconitus*, proved by Dr. Stanton to be a carrier of malaria, is the chief factor in determining its presence or absence in rice fields in valleys in Malaya.*

The p.H of the water which formerly bred *A. ludlowi* at Port Swettenham, and of pools and conduits in the vicinity of mangrove swamps generally, closely approximates to, and is usually slightly above 8, these brackish waters being distinctly alkaline.†

While therefore the species which breed in open waters in flat land seem to tolerate slight acidity, they have been found to be absent from very acid waters. There are doubtless many other factors determining the prevalence of the larvae of particular species, besides the degree of acidity or alkalinity of the water, and it is to the chemical causes, and biological concomitants, of the latter that we must look for new light upon old problems. That this is true is shown by the fact that the water in rice fields, etc., may be as acid as that in some of the adjacent hill streams without harbouring *A. maculatus* or its associates.

A. umbrosus has been found in water of extreme acidity, with a p.H value under 5.0, usually peaty in character, devoid of algal growth, and often containing rotting leaves. Since p.H values can be altered by minute traces of dissolved substances, such as lime, it is not impossible that further study of the subject may lead to improved methods of control; but to the difficulty of locating and dealing with underground springs, is superadded the massive effect of the soil, and its power of absorbing and modifying chemicals present in percolating water.

The observations so far made only prove that this line of enquiry is worth pursuing, and calls for co-operative effort in different districts. But the broad inference is perhaps justified that, though the larvae of Malayan anophelines are not fastidious as to a few points of p.H within their ranges, there are limits, awaiting detailed determination, which particular species do not usually pass in nature. And the emphasis laid by Sir Malcolm Watson, Dr. Lamborn, and Dr. Hacker and others upon the importance of subtle chemical differences in breeding waters appears to be fully justified.

A start has also been made with the work of collecting algae, and other water plants, and also water insects and fish, so as to correlate their presence with the presence or absence of anopheline larvae in general, or with that of particular species, and with the reaction of the water in which they occur. The main objects of the botanical enquiry are, firstly to record indicator plants, likely to establish the probability of the presence of particular species of larvae in suspected spots, and thus to lighten the work of preliminary anti-malarial surveys; and, in the case of algae, if possible to discover in addition what relation, direct or indirect, particular species bear to larval food supplies. The feeding habits of larvae, and the varying power of different species to assimilate the micro-organisms present in different kinds of water, together probably constitute the prime factors which regulate

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* "The Prevention of Malaria in the Federated Malay States" pp. 213, 218, 211: John Murray, 1921.

† The salinity of the Port Swettenham waters was determined by titration with the following results. Percentage of total chloride calculated as sodium chloride :

(*a*) River water at high tide 2.1, (*b*) water in a pool not reached by ordinary high tide 1.4, (*c*) heavily oiled water in an old boat stranded on the mud 1.1. Larvae have been found to be abundant in a situation similar to (*c*) and its degree of salinity is probably nearer the optimum for the Malayan form of this species than that in (*a*) or (*b*); for, as Dr. Hacker and others have observed, larvae of *A. ludlowi* occur in pools at some distance inland, or up stream, from salt tidal waters. Since, however, the species occurs inland in Java and Sumatra, and since Dr. Lamborn reared adults from the eggs in water free from salt, the latter may be an accidental preference, or one of several alternatives which propitiate the instincts of the female insects, bent on egg laying, or determine the survival of the larvae, perhaps by killing off enemies.

their distribution in nature. The subject is therefore one of special interest, and it is hoped to continue the investigations started by Dr. Lamborn. The need for relating this and other lines of enquiry to chemical investigations in general, and particularly to very numerous and detailed analyses of breeding waters, beyond the Bureau's present power to carry out unaided, has already been reported by Dr. Hacker.

The object of recording observations on fish and aquatic insects (which together with plants may also serve as indicators of particular types of water) is to add to our knowledge of those species which feed either on larvae or on their enemies, and which therefore tend respectively to check, or to favour, mosquito-breeding. The dual nature of the problem is illustrated by recent observations on two types of water bugs belonging to the family *Nepidae* which are provided with raptorial forelegs, resembling those of a Mantis, but which suck their prey instead of chewing it. The first type, identified by Mr. Pendlebury as belonging to the genus *Cercotmetus* is provided with a short and broad tail siphon, through which it breathes air. It generally floats with its body extended immediately below the water surface, and therefore appears to be specialised in structure and habits for feeding on mosquito-larvae, especially those of anopheline species. Individuals have continued to grow, and to cast their skins from time to time, when fed for several weeks on anopheline larvae, one insect killing about twenty daily. A small fish will devour as many in a few minutes when so disposed.

The other type of Nepid studied includes the much commoner and very widely distributed species of *Ranatra* which are provided with long and thin tail siphons. They will catch anopheline larvae if placed in very shallow water, and possibly do so occasionally in nature. But they usually creep about on submerged water plants, bringing only the tips of their siphons to the surface in order to breathe. Observations made in Krian go to show that in rice fields they feed upon free-swimming organisms, captured under water, including mayfly larvae, which are themselves reputed to be among the most destructive enemies of mosquito larvae. The activities, for good or ill, of both types, but especially of *Ranatra*, are liable to supplement those of fish, which do not usually penetrate into the weeds where small insects find asylum.

Observations have also been in progress on the larvicidal powers of fishes, including one newly found to be efficient by Mr. Syed Abdullah, the Malarial Investigator at Port Dickson. These, and kindred enquiries relating to destructive insects, can only be pursued incidentally to the main lines of investigation planned or in progress.

It is hoped to resume the collection of epidemiological data, interrupted by Dr. Hacker's absence, in connection with the field investigations to be started early in the new year.

The scope of anti-malarial research is so wide that it is impossible for a newcomer, lacking experience of the country and its problems, to do justice to it, or to the claims of future work, in a report dealing with the unavoidably fragmentary accomplishment of the current year. I venture, however, to express the conviction that, if the various necessary lines of investigation, chemical, microbiological, entomological and epidemiological, including routine blood and spleen work, and researches upon the malarial parasites, is to be carried out thoroughly, the higher staff of the Bureau will still be very inadequate for the work in hand, when Dr. Hacker returns. The whole time of one investigator might profitably be employed upon epidemiological work alone, and in adding to our knowledge of the infectibility, and power of transmitting parasites of varying degrees of virulence, possessed by different species of anophelines, under differing conditions. And the same is equally true for the other sciences named, their multiplicity, together with the need for prolonged absences in the field, which is a peculiar feature of malarial work, leaving too little uninterrupted time for technical researches. The provision of travelling field laboratories, already advocated by Dr. Hacker, would do much to meet the difficulty by greatly increasing the effectiveness of the staff at a relatively small cost.

A preliminary note on the work to be done in rice fields, as well as one attempting a general survey of the possibilities of anti-malarial investigation in the Federated Malay States, has been submitted to the Malaria Advisory Board.

It is a pleasure to acknowledge the friendly help of Capt. Pendlebury and Mr. Gater, Entomologists, respectively, to the Museum and to the Department of Agriculture, and the assistance similarly received from the Director of Government Laboratories and his staff. The fact of being able, on first arrival, through Mr. Blair's kindness, to work for a time in the Chemical Laboratory of the Institute was particularly helpful. Finally such work as has been accomplished has been possible only through the Bureau's staff of expert assistants.

K. B. WILLIAMSON,
Malaria Research Officer.

30th January, 1925.

REPORT OF THE CHEMIST UPON THE WORK OF THE CHEMICAL LABORATORY, INSTITUTE FOR MEDICAL RESEARCH, FOR THE YEAR ENDING 31ST DECEMBER, 1924, WITH APPENDICES.

The chemical work of the following departments is performed wholly or in part in the Chemical Laboratory—Medical, Trade and Customs, Police, Railway and Public Works

The total number of samples examined in the course of the year was 7,368 as compared with 6,521 in the preceding year, an increase of 847. Samples of chandu dross have increased from 3,402 to 3,906, and samples of chandu from 61 to 353, while there are notable increases in the number of exhibits for toxicological analyses, and of sewage effluents.

MEDICAL DEPARTMENT.

Chemical work is performed for the Medical Department in connection with the Health Branch and the Hospitals Branch. The samples submitted may be classified as follows:

(1) Milk;

(2) Condensed milk;

(3) Water;

(4) Sewage effluent;

(5) Toddy;

(6) Exhibits for toxicological analysis;

(7) Miscellaneous articles.

(1) *Milk.*—The following standards are prescribed for milk in the rules of "The Sale of Food and Drugs Enactment, 1913":

(*a*) The quantity of milk fat present in milk must not be less than 3.25 per cent. of the total component parts thereof;

(*b*) The quantity of milk solids, other than milk fat, present in milk must not be less than 8.5 per cent. of the total component parts thereof.

Seven hundred and fifty-six samples were examined to ascertain whether they conformed to these rules. Of these, 34 contained less than 3.25 per cent. of milk fat, and 238 contained less than 8.5 per cent. of milk solids, other than milk fat. In addition, four samples of milk taken from the Kuala Lumpur Dairy, which supplies the hospitals in Kuala Lumpur, were examined chemically and bacteriologically to ascertain the quality of the milk being supplied.

(2) *Condensed Milk.*—Three samples were examined. Two of these were milk powders and one condensed skimmed milk. The prohibition of the importation into the Federated Malay States of machine-skimmed or hand-skimmed milk is under consideration.

(3) *Water.*—Chemical analyses were carried out on 347 samples and bacteriological examinations on 41 samples of water. The chemical examinations of the raw and filtered waters of the Kuala Lumpur supply numbered 231, the averages for each month and for the year are shown in appendix B. In connection with the proposed new supply for Kuala Lumpur, chemical and bacteriological examinations of the raw water from the River Gombak were carried out in order to ascertain the quality of the raw water as compared with the raw water from the Intake Works, Ampang.

The following public supplies were also visited and reports, based on chemical and bacteriological examinations, were made:

Kuala Lipis, Pekan, Tanjong Rambutan, Telok Anson, Telok Datoh, and Klang water supplies.

With reference to the Klang water supply, where the raw water is treated with chlorine, no complaints regarding taste have been received.

(4) *Sewage Effluents.*—Fifteen samples of effluent were investigated. This work was carried out to ascertain the quality of the effluents from the new sludge tank at "Carcosa" and the septic tank installation at the Railway Station, Ipoh.

(5) *Toddy.*—Premises on which toddy is sold are open to inspection by officers of the Health Branch, who are also empowered to take samples for analysis. The samples were examined to ascertain whether they complied with the standards prescribed in the rules of "The Sale of Food and Drugs Enactment, 1913," viz., "toddy" must not contain more than ten per centum of alcohol by volume or have an acidity exceeding 0.8 per centum expressed in terms of acetic acid. Four hundred and fifty-seven samples were examined. In two cases the acidity exceeded 0.8 per centum. No sample contained more than 10 per centum of alcohol by volume. Two hundred and sixty-seven of the samples were from toddy shops under the control of estate managers.

(6) *Toxicological Analyses.*—Thirty exhibits were submitted by the Medical authorities. These included viscera, foods and medicines for suspected poison.

Human Poisoning.—Six cases were investigated, poison being found in one case.

Case.—Nitric acid and hydrochloric acid poisoning—suicide. A Japanese drank some aqua regia—a mixture of nitric and hydrochloric acids—and died from irritant poisoning. The lips, tongue, mouth and oesophagus were found corroded and the stomach perforated in several places.

Other Animal Poisoning.—Viscera from eight cattle were examined for arsenic, which was found in four cases.

In addition, the viscera from two fowls were examined—arsenic being found in both cases.

Miscellaneous Exhibits for Poison.—Samples to the number of eleven were submitted for examination for poison, these included medicines, pills, mangoes, tea and rice. In two cases arsenic was found.

Miscellaneous Samples.—There were fifteen miscellaneous samples. Included in this total were samples of medicines, disinfectant, vomit and urine.

Vitamin B Extract.

The preparation of this extract from rice polishings, for use in the treatment of beriberi, was continued throughout the year. During the year 7,251 fluid ounces were prepared, and 6,630 fluid ounces were issued to medical practitioners, dispensaries and hospitals. Eight hundred and sixty-two fluid ounces were issued free, the remainder was sold at 25 cents per fluid ounce, this being the estimated cost of production. The revenue from this source was $1,270.

TRADE AND CUSTOMS DEPARTMENT.

The work for this department consists mainly in the examination of samples in connection with the assessment of duty, e.g., wines, potable spirits, liquors, denatured spirits and essences, and samples of chandu and chandu dross submitted by the Chandu Monopoly Department in connection with the administration of the Chandu Enactment.

Liquors.

In connection with the assessment of duty, 106 samples of alcoholic liquors and 30 of essences were tested for their spirit strength. In addition eight samples were examined for denaturants, all of which contained the necessary ingredients.

Toddy.

The acidity and alcoholic strength were estimated in 44 samples.

Chandu.

Under the provisions of the Chandu Enactment, the importation of chandu of other than Government manufacture is prohibited. The Enactment, further, makes it an offence to be in possession of:

(*a*) any chandu reprepared from chandu dross;

(*b*) more than seven and a half tahils of Government chandu.

N.B.—One tahil equals approximately 37.8 grammes.

Three hundred and fifty-three samples of chandu and substances suspected to contain chandu were received. Of these, 148 were found to be Government chandu, 24 illicit chandu, 10 chandu prepared from Government chandu dross, and 13 imitation chandu containing no opium.

The remaining 158 samples consisted of samples of adulterated Government chandu, pills and dross.

Chandu Dross.

The Chandu Monopoly Department purchases chandu dross from licensees at prices varying with the quality of the dross. The chandu dross is collected and weekly inspections of the dross received by the Chandu Monopoly Department are made by a Chemist from this Laboratory. Samples of all dross which appear to be of inferior quality are taken for analysis, and in addition samples of dross from all licensees are analysed two or three times a year. The number of samples of dross inspected during the year was 3,906, of which 509 were analysed.

The samples analysed were graded as follows:

Grade I	485
,, II	16
,, III	8

Deleterious Drugs.

Under the provisions of "The Deleterious Drugs Enactment, 1911," it is an offence to import, sell, or use without licence certain drugs (morphine, cocaine, eucaine, etc.) or preparations containing more than a certain percentage of these drugs. In suspected cases, the officers of the Chandu Department take samples which are examined in this Laboratory.

No sample during the year was received from the Chandu Monopoly Department.

Miscellaneous Samples.

Twenty-one samples were examined including seven samples of suspected ganja (six of which contained ganja), five of oils for flash point, and two of suspected alum, in which no alum was found. In addition, two Sikes's hydrometers were tested for the Customs Department by comparison with the standard instrument in this Laboratory.

POLICE DEPARTMENT.

Twelve hundred and twenty-four samples submitted by the Police authorities in connection with proposed proceedings in the Courts may be classified as follows:

(1) Coins and coining materials;
(2) Articles for blood stains;
(3) Toxicological analyses;
(4) Liquors and toddy;
(5) Deleterious drugs;
(6) Miscellaneous.

(1) *Coins and Coining Materials.*—The number of exhibits examined was 1,046. Of these, 877 were counterfeit coins, 141 genuine coins and four moulds. In addition pieces of metal and chemicals used in the manufacture of counterfeit coins were examined.

(2) *Articles for Blood Stains.*—Exhibits in connection with murder cases, etc., are forwarded by the Police authorities for examination for blood stains. The number of exhibits received was 80, of which 35 gave positive results. Thirty-four of the exhibits which gave positive reactions for blood were further examined by the precipitin test for human serum, 27 of these gave the reaction characteristic of human serum. The results of the examinations are tabulated below:

Exhibits.	Number examined.	Number blood stained.	Number human blood.
Knives, parangs, etc.	... 27	... 9	... 7
Articles of clothing	... 35	... 22	... 17
Wood, mats, attap, etc. ...	... 16	... 3	... 2
Glass beads	... 1	... 1	... 1

(3) *Toxicological Analyses.*—Forty-eight exhibits were received for examination. Of these, 14 were of human viscera, in 7 of which poison was identified. Morphine was found in 3 cases, opium 1, arsenic 1, sodium carbonate 1 and aqua regia 1. In the last two cases, sodium carbonate and aqua regia had been drunk, the symptoms and appearance of the stomach being consistent with poisoning by these substances. Other exhibits received in connection with human poisoning included a sample of morphine hydrochloride, one vomit, one stomach wash and one sample of brandy, in all of which morphine hydrochloride was found; two samples of chlorodyne, two liquids in which potassium cyanide was found, and one liquid in which nitric acid was found.

Miscellaneous exhibits examined for poison included one datura capsule, two ashes, one pill containing dirty cotton waste, two powders containing glass and one sample of cooked rice in which powdered glass was found.

(4) *Liquors.*—Nine samples of liquors and four samples of toddy were examined.

(5) *Deleterious Drugs.*—Three powders suspected to contain deleterious drugs were analysed, of which two were found to be starch and one rice polishings.

(6) *Miscellaneous.*—Samples to the number of 34 included stout, Chinese crackers, ganja and a pistol.

OTHER DEPARTMENTS.

Three boiler feed waters, three lubricating oils and one deposit from a blast pipe were submitted by the Railway Department.

Two boiler waters and one sample of coal were examined for the Chief Electrical Engineer

Two samples of sealing wax, in connection with a prosecution for theft, were examined for the Post and Telegraph Department.

One liquid said to be used for artificial ripening of persimmons was examined for the Chairman, Sanitary Board, Kuala Lumpur.

Nine patent specifications in connection with "The Inventions Enactment, 1914," were examined for the Federal Secretariat.

PRIVATE ANALYSES.

Seventeen examinations were carried out. Included in this total were ten samples of water, three samples of damaged rice, three oils for flash point, and the viscera of one cat for poison.

In addition, exhibits for blood stains were examined for the Chief Police Officer, Kedah.

The fees for these analyses amounted to $395.

LEGAL PROCEEDINGS.

Members of the staff of the Chemical Laboratory gave evidence in legal proceedings in 34 cases.

STAFF.

The staff of the Chemical Laboratory consists of:

Chemist;
Two Assistant Chemists;
Five Laboratory Assistants;
One Laboratory Attendant;
Two Attendants for gas plant.

Mr. R. W. Blair returned from vacation leave on 22nd July, 1924.

Mr. J. Shelton proceeded on leave on 2nd August, 1924.

INSTITUTE FOR MEDICAL RESEARCH,
FEDERATED MALAY STATES,
KUALA LUMPUR.

R. W. BLAIR,
Chemist, Government Laboratories,
Federated Malay States.

Appendix A.

TOTAL NUMBER OF SAMPLES EXAMINED IN THE CHEMICAL LABORATORY DURING THE YEARS ENDING 1923 AND 1924.

	Number of Analyses, 1924.	Number of Analyses, 1923.
Medical Department.—		
Milk, chemical	760	774
Milk, bacteriological	4	Nil
Condensed milk	3	14
Water, chemical	347	343
Water, bacteriological	41	40
Sewage effluents	15	4
Toddy	457	416
Liquors	Nil	3
Oils, fixed	Nil	1
Toxicological analyses	30	11
Miscellaneous	15	45
Trade and Customs Department.—		
Liquors	114	81
Toddy	44	59
Chandu	353	61
Chandu dross	3,906	3,402
Deleterious drugs	Nil	3
Miscellaneous	23	13
Police Department.—		
Coins and coining materials	1,046	993
Articles for blood stains	80	106
Toxicological analyses	48	24
Liquors	9	34
Toddy	4	6
Deleterious drugs	3	4
Miscellaneous	34	22
Other Departments.—		
Miscellaneous	14	26
Private Analyses.—		
Water	11	8
Milk	1	3
Spirits	Nil	3
Toxicological analyses	1	2
Miscellaneous	5	20
Total	7,368	6,521

Appendix B.

KUALA LUMPUR WATER SUPPLY.

Chemical Averages for each month of the year 1924. Parts per 100,000 unless otherwise stated.

Month.	Impounding Reservoir. (Raw Water.)								Intake Works, Ampang. (Raw Water.)							
	Colour M. M. Brown.	Ammoniacal nitrogen.	Albuminoid nitrogen.	Oxygen absorbed in 3 hrs.	Chlorine.	Total solids.	Oxidized nitrogen.	Rainfall in inches.	Colour M. M. Brown.	Ammoniacal nitrogen.	Albuminoid nitrogen.	Oxygen absorbed in 3 hrs.	Chlorine.	Total solids.	Oxidized nitrogen.	Rainfall in inches.
January	21	.0005	.0100	.1617	.05	4.0	.000	5.18	19	.0007	.0056	.1663	.05	2.7	.006	5.99
February	18	.0002	.0125	.1547	.09	4.8	.002	9.75	19	.0004	.0051	.1589	.05	6.6	.006	6.20
March	21	.0005	.0110	.1646	.06	3.5	.002	15.01	21	.0008	.0050	.1692	.05	4.0	.004	13.92
April	20	.0007	.0143	.1741	.06	4.0	.002	6.72	21	.0006	.0040	.1504	.05	3.2	.004	8.57
May	24	.0007	.0145	.1584	.07	4.0	.002	10.01	25	.0012	.0057	.2090	.05	4.6	.004	8.37
June	19	.0007	.0105	.1356	.06	5.0	.002	6.24	19	.0010	.0053	.1374	.05	4.2	.005	9.83
July	20	.0004	.0100	.1422	.06	4.6	.002	4.58	22	.0010	.0059	.1256	.05	4.1	.003	3.90
August	20	.0004	.0112	.1380	.07	4.9	.002	5.42	22	.0006	.0056	.1354	.05	4.2	.004	6.68
September ...	25	.0006	.0107	.1604	.06	5.5	.002	10.81	30	.0005	.0051	.1716	.05	5.2	.005	11.65
October	21	.0006	.0094	.1372	.06	4.5	.004	4.32	25	.0011	.0049	.1548	.05	4.6	.005	6.56
November	26	.0006	.0096	.1495	.07	4.0	.004	8.79	32	.0004	.0044	.1422	.06	3.8	.005	10.16
December	22	.0007	.0100	.1427	.07	2.7	.002	4.45	28	.0007	.0048	.1541	.06	4.5	.005	7.48
Averages ...	21	.0006	.0111	.1516	.07	4.3	.002	7.61	24	.0008	.0051	.1562	.05	4.3	.005	8.28

Month.	Maxwell's Hill Reservoir. (Filtered Water.)							Weld Hill Reservoir. (Filtered Water.)						
	Colour M. M. Brown.	Ammoniacal nitrogen.	Albuminoid nitrogen.	Oxygen absorbed in 3 hrs.	Chlorine.	Total solids.	Oxidized nitrogen.	Colour M. M. Brown.	Ammoniacal nitrogen.	Albuminoid nitrogen.	Oxygen absorbed in 3 hrs.	Chlorine.	Total solids.	Oxidized nitrogen.
January	21	.0000	.0048	.1011	.05	2.0	.006	18	.0002	.0030	.1030	.05	2.0	.008
February	15	.0001	.0039	.0885	.05	3.9	.002	18	.0001	.0032	.1184	.04	3.0	.006
March	18	.0002	.0049	.1089	.06	3.2	.006	21	.0002	.0034	.1280	.05	4.6	.006
April	16	.0007	.0043	.0908	.06	3.2	.003	22	.0005	.0031	.1346	.05	3.8	.006
May	18	.0008	.0048	.0889	.07	3.7	.001	22	.0006	.0033	.1229	.05	4.0	.006
June	14	.0053	.0063	.0791	.06	4.5	.001	19	.0008	.0033	.0989	.05	4.5	.006
July	16	.0006	.0071	.0947	.06	4.4	.008	18	.0001	.0029	.1053	.05	4.4	.005
August	14	.0001	.0049	.0720	.06	4.0	.003	20	.0003	.0035	.1120	.05	4.0	.006
September	17	.0003	.0058	.0925	.06	4.0	.004	26	.0003	.0036	.1411	.05	—	.002
October	16	.0004	.0048	.0736	.06	3.0	.004	20	.0005	.0034	.0907	.05	4.2	.006
November	21	.0001	.0064	.0877	.07	3.0	.004	27	.0000	.0040	.1297	.06	3.2	.006
December	20	.0004	.0075	.0989	.07	4.2	.006	23	.0002	.0034	.1008	.06	3.7	.006
Averages ...	17	.0008	.0055	.0897	.06	3.6	.004	21	.0003	.0033	.1155	.05	3.8	.006

REPORT OF THE SENIOR HEALTH OFFICER, FEDERATED MALAY STATES, FOR THE YEAR 1924.

HEALTH STAFF.

1. The sanctioned staff of the Health Branch was for this year: a Senior Health Officer, fifteen Health Officers, one Chief Sanitary Inspector (European) and twenty-eight Sanitary Inspectors (Asiatics), a reduction on last year's sanctioned staff of seven Chief Sanitary Inspectors.

2. As was the case in former years there was not a sufficiency of Health Officers to fill the various posts and the work was carried on with aid from the Medical Branch.

3. For the greater part of the year the European staff consisted of the Senior Health Officer, four Health Officers, and four Medical Officers, and during two months the number of Medical Officers was reduced to two.

The Asiatic staff was up to strength.

4. The following table shows the changes which occurred:

Name of officer.	Designation.	Date of change.	From which district.	To which district.	Remarks.
E. H. Black ...	Health Officer	12-12-24	Europe ...	Kuala Lumpur	Return from leave
R. L. Symes ...	Medical Officer	1- 4-24	Kinta, Lower Perak	—	Resigned
F. V. Jacques ...	,,	2- 4-24	Kuala Lumpur	Kinta. In addition to Lower Perak and Perak North	
,, ...	...	16- 6-24	Kinta ...	—	Relieved of Pk. North
H. G. Holdbrook	Medical Officer	26- 4-24	Perak North...	Medical	
P. G. Temple ...	,,	16- 6-24	Medical Branch	Perak North	
,, ...	...	9-12-24	Perak North...	Lower Perak	
M. J. Graham ...	Health Officer	14- 3-24	Europe ...	Selangor East	Recruit
,, ...	...	2- 4-24	Selangor East	Kuala Lumpur	
,, ...	...	16- 9-24	Kuala Lumpur	Lower Perak	
,, ...	...	9-12-24	Lower Perak...	Selangor Coast	
R. P. Bliss ...	Medical Officer	1- 8-24	Europe ...	Negri Sembilan	,,
V. D. Wyborn ...	,,	1- 8-24	,, ...	Selangor East	,,

5. The frequent changes, the filling of posts by Medical Officers who had had no special health training, and the occupation of two or more billets by one officer—all were detrimental to efficiency.

6. In order to assist in the carrying out of district work the Chief Sanitary Inspector who acted as Office Assistant to the Senior Health Officer was sent to Lower Perak to do duty under Health Officer who had two (and for some months, three) health districts to administrate.

7. The lack of an Assistant at head-quarters made it necessary for the Senior Health Officer to spend more time there than would otherwise have been the case—and the district inspection was curtailed.

REVENUE AND EXPENDITURE.

8. The only revenue collected was that for certificates issued under the Registration of Births and Deaths Enactment. This sum amounted to $2,030.

9. The expenditure debited against the Health Branch was:

Personal emoluments	$159,539
Temporary allowances	25,393
Other charges, annually recurrent	60,087
Other charges, special expenditure	19,365
	$264,384
Clerical service	39,147
Total ...	$303,531

GENERAL REVIEW OF WORK DONE BY THE HEALTH BRANCH.

10. The duties of the members of the Health Branch include:

(i) Vital statistics and work under the Registration of Births and Deaths Enactment.

(ii) Malaria investigation and control, and anti-mosquito measures.

(iii) Work under the following Enactments:

(*a*) Quarantine and Prevention of Disease Enactment;

(*b*) Sanitary Boards Enactment;

(*c*) Sale of Food and Drugs Enactment;

(*d*) Labour Code.

(iv) General, including inspection of schools, Government lines, waterworks, etc., etc.

11. Once again the paucity of Health Officers made it impossible to carry out the duties in full—and certain duties which otherwise would have been done were left undone and others were only partially done.

12. Work under the Registration of Births and Deaths Enactment was more or less up to date.

13. Work in connection with Malaria and Mosquito Destruction Boards suffered from paucity of Health Officers and from the frequent changes in staff. The loss of the Chief Sanitary Inspectors was keenly felt, and both investigation, control and teaching suffered.

14. Under the Quarantine and Prevention of Disease Enactment, work was shared with the Medical Branch. Rules of procedure were drawn up defining the duties respectively of the Senior Health Officer, the Senior Medical Officer, the Medical Officers and the Health Officers.

15. Under the Sanitary Boards Act, as in former years, the work was chiefly done by Sanitary Board Inspectors under the supervision of the Chairman, Sanitary Board, the Health Officer acting as Adviser only.

16. Under the Sale of Food and Drugs Act very little was done.

17. Work under the Labour Code suffered both from the lack of Health Officers and from the frequent changes. Several Health Officers gave evidence before the Commission on Estate Sanitation whose report was recently published.

18. School inspection received as much attention as was possible under the circumstances.

HEALTH LEGISLATION.

19. The only law influencing Public Health passed in 1924 was the Rules under "The Labour Code, 1923," published in *Gazette* Notification No. 300 dated 11th January, 1924.

VITAL STATISTICS.

20. Populations are estimated from the census figures which are believed to be correct. Immigration and emigration have a great influence on the population more so than have births and deaths. Accurate data *re* immigrations and emigrations, especially by rail, are not available and tables cannot be given.

21. Increase in population is calculated on the arithmetical increase basis as experience has shown this to be more reliable than that based on geometrical grounds.

22. Births and deaths figures are obtained from notifications compulsory under the Registration of Births and Deaths Enactment which applies everywhere. The total numbers given are approximately correct. The accuracy of the diagnoses as to the causes of deaths is in the majority of cases open to question for few of the cases are seen by qualified medical men before death. In each of the four large towns every uncertified body is viewed by a qualified Assistant Surgeon who interrogates the friends and forms a diagnosis. In rural districts these duties are carried out by the Police.

23. Deaths in towns are debited against the town in which death occurs only if the deceased was in residence for three months previous to death. In former years this qualifying period was one month.

24. The towns all contain hospitals which cater not only for the towns' people but for the rural population surrounding them. Towns attract chronic cases of disease which drift to them in the hope of obtaining better medical relief than is to be found in the rural areas. Even with the qualifying period of three months there are a number of deaths debited against towns which should be debited elsewhere.

25. In order that comparisons may be made with last year, the rates for the four large towns are also calculated on a one month's basis. After this year calculations will only be made on the three months' basis. The qualification basis in the Straits Settlements is three months—so that comparisons can now be made between the Federated Malay States and the Straits Settlements.

26. Assuming that the rate of population increase is the same as that during the intercensal period and judging from the sickness and death returns furnished to the department the health of the people during 1924 was better than that of 1923. The general death-rate was 23.68 per mille which is the lowest on record, that for 1923 was 24.40.

27. The number of deaths attributed to fevers (most of them probably malarial) was 14,283 or 42.53 per cent. of the total. Last year the percentage was higher, viz., 45.75.

28. Dysentery and diarrhoea accounted for 5.84 per cent. of the total deaths, pulmonary tuberculosis for 5.70 per cent., pneumonia for 5.02 per cent., and convulsions for 10.77 per cent.

29. Because of the peculiar age and sex distribution and the fact that the labour of this country is largely imported males aged from 20-45 and declared as medically fit before the departure from their own countries, the death figures cannot be compared with countries where the labour is indigenous. With normal age and sex distribution the death-rate would probably be at least twice what it now is.

VITAL STATISTICS (FEDERAL).

Population.

30. The population of the Federated Malay States as estimated was at the end of June, 1924, 1,418,455 distributed as follows:

Perak	633,179
Selangor	435,775
Negri Sembilan	194,545
Pahang	154,956

31. The race distribution was as follows:

Europeans and Americans	6,467
Eurasians	3,385
Malays and other natives of the Archipelago	540,065
Chinese	514,472
Indians	348,363
Others	5,703
Total, F.M.S. ...	1,418,455

Births.

32. Thirty-nine thousand five hundred and twelve births were registered during the year, giving a birth-rate of 27.86 per mille of population. In 1923 the number was 35,653 and the rate was 25.66.

The following table shows the number of births and birth-rates according to races:

Race.	No. of births.	Birth-rate.
Europeans and Americans	112 ...	17.32
Eurasians	126 ...	37.22
Malays and other races of the Archipelago ...	20,221 ...	37.44
Chinese	10,929 ...	21.24
Indians	8,054 ...	23.12
Others	70 ...	12.27

Deaths.

33. Thirty-three thousand five hundred and eighty-five deaths were registered, giving a death-rate of 23.68 per mille. The number of deaths in 1923 was 33,914 and the rate was 24.40.

The distribution of deaths among the several races was as follows:

Race.	No. of deaths.	Death-rate.
Europeans and Americans	36 ...	5.57
Eurasians	45 ...	13.29
Malays and other races of the Archipelago ...	13,185 ...	24.41
Chinese	12,105 ...	23.53
Indians	8,057 ...	23.13
Others	157 ...	27.53

34. The deaths and death-rates for the total population for the last ten years were as follows:

Year.	Population.	Deaths.	Rate per mille.
1915	1,172,336	33,899	28.92
1916	1,208,177	36,985	30.60
1917	1,244,018	42,514	34.17
* 1918	1,279,859	67,639	52.85
1919	1,315,700	38,645	29.37
1920	1,351,541	43,705	32.34
1921	1,304,825	38,077	29.18
1922	1,360,876	35,028	25.74
1923	1,389,667	33,914	24.40
1924	1,418,455	33,585	23.68

35.— *Table showing causes of deaths in 1924.*

Diseases.	No. of deaths.	Rate per mille.
Malaria	14,283	10.07
Dysentery and diarrhoea	1,961	1.38
Pneumonia	1,688	1.19
Pulmonary tuberculosis	1,916	1.35
Ankylostomiasis	257	0.18
Beri-beri	453	0.32
Syphilis	85	0.06
Enteric	40	0.03
Tetanus	130	0.09
Diphtheria	17	0.01
Convulsions	3,619	2.55
Bright's disease	151	0.11
Ptomaine poisoning	153	0.11
Influenza	61	0.04
Other diseases	8,771	6.18

36. The following table shows the deaths and death-rates from the principal diseases for the last ten years:

Year.	Malaria.		Dysentery and diarrhoea.		Pulmonary tuberculosis.		Beri-beri.	
	Deaths.	Rate.	Deaths.	Rate.	Deaths.	Rate.	Deaths.	Rate.
1915	15,208	12.97	3,148	2.63	1,995	1.70	871	0.74
1916	17,627	14.58	3,197	2.64	2,193	1.81	757	0.62
1917	18,750	15.07	4,942	3.97	2,446	1.96	1,207	0.97
† 1918	31,515	24.62	4,280	3.34	3,184	2.48	1,277	0.98
1919	16,975	12.90	3,712	2.82	2,445	1.86	930	0.71
1920	20,595	15.24	3,804	2.81	2,634	1.95	431	0.32
1921	17,168	13.16	2,999	2.30	2,255	1.73	422	0.32
1922	15,570	11.44	2,419	1.78	2,393	1.76	443	0.33
1923	15,516	11.17	2,142	1.55	1,934	1.39	378	0.27
1924	14,283	10.07	1,961	1.38	1,916	1.35	453	0.32

VITAL STATISTICS (*State figures for comparison*).

37.— *Birth Table.*

State.	No. of births.	Birth-rate per 1,000 living.	1923 Birth-rate.
Perak	17,482	27.61	26.14
Selangor	11,868	27.23	23.81
Negri Sembilan	5,298	27.23	25.79
Pahang	4,864	31.39	28.68

* High figure due to influenza epidemic. † Influenza epidemic year.

38.— *Birth statistics of different nationalities.*

State.	Europeans and Americans.		Eurasians.		Malays and other races of the Archipelago.		Chinese.		Indians.		Others.	
	Births.	Birth-rate.	Births.	Birth-rate.	Births.	Birth-rate.	Births.	Birth-rate.	Births.	Birth-rate.	Births.	Birth-rate.
Perak	40	17.71	35	34.48	9,158	36.32	5,026	22.14	3,177	21.35	46	23.19
Selangor	64	22.61	65	38.08	3,892	38.72	3,911	22.08	3,917	25.85	19	9.21
Negri Sembilan	3	2.85	25	46.55	3.231	40.28	1,244	17.02	793	20.51	2	2.01
Pahang	5	15.43	1	7.94	3,940	36.76	748	20.06	167	17.83	3	4.54

39.— *Death table (State figures for comparison).*

State.	No. of deaths.	Death-rate, 1924.	Death-rate, 1923.
Perak	14,768	23.32	25.07
Selangor	9,371	20.50	23.37
Negri Sembilan ...	4,883	25.10	24.67
Pahang	4,563	29.45	24.24

40.— *Deaths and death-rates of different nationalities.*

State.	Europeans and Americans.		Eurasians.		Malays and other races of the Archipelago.		Chinese.		Indians.		Others.	
	Deaths.	Death-rate.	Deaths.	Death-rate.	Deaths.	Death-rate.	Deaths.	Death-rate.	Deaths.	Death-rate.	Deaths.	Death-rate.
Perak	15	6.64	12	11.82	5,641	22.37	5,505	24.25	3,538	23.78	57	28.73
Selangor	17	6.00	22	12.89	2,023	20.13	4,194	23.68	3,032	20.01	83	40.21
Negri Sembilan	3	2.85	8	14.90	2,207	27.51	1,498	20.50	1,157	29.92	10	10.01
Pahang	1	3.09	3	23.81	3,314	30.92	908	24.35	330	35.23	7	10.59

41.— *Table showing deaths and death-rates from principal diseases.*

State.	Malaria.			Dysentery and diarrhoea.			Pulmonary tuberculosis.			Peri-beri.		
	Deaths.	Rate.		Deaths.	Rate.		Deaths.	Rate.		Deaths.	Rate.	
		1924.	1923.		1924.	1923.		1924.	1923.		1924.	1923.
Perak	6,752	10.66	12.46	760	1.20	1.26	951	1.50	1.52	93	0.15	0.13
Selangor	3,228	7.40	9.48	726	1.67	1.93	592	1.36	1.48	141	0.32	0.25
Negri Sembilan ...	2,042	10.50	10.53	257	1.32	1.45	295	1.52	1.41	130	0.67	0.59
Pahang	2,261	14.59	11.36	218	1.41	1.73	78	0.50	0.58	89	0.57	0.54

INFANTILE MORTALITY.

42. There were 7,133 deaths of children under one year of age. The infantile mortality rate or rate per 1,000 births was 180.53; the rate for 1923 was 180.07.

Infantile Mortality Table.

State.	Death of children under one year of age.	Death-rate per 1,000 births.
Perak	2,767	158.28
Selangor	2,040	171.89
Negri Sembilan	1,091	205.93
Pahang	1,235	253.91

43.— *Deaths from zymotic diseases.*

State.	Plague.	Cholera.	Smallpox.	Cerebro-spinal meningitis.
Perak	—	4	1	—
Selangor	—	—	—	3
Negri Sembilan	—	—	—	—
Pahang	—	—	—	—

44.— *Death-rates of principal diseases for the last seven years.*

Year.	Perak.			Selangor.			Negri Sembilan.			Pahang.		
	Malaria.	Dysentery and diarrhoea.	Pulmonary tuberculosis.	Malaria.	Dysentery and diarrhoea.	Pulmonary tuberculosis.	Malaria.	Dysentery and diarrhoea.	Pulmonary tuberculosis.	Malaria.	Dysentery and diarrhoea.	Pulmonary tuberculosis.
*1918	Unreliable.			20.29	3.78	1.62	36.31	5.84	4.93	26.62	1.63	1.41
1919	13.45	2.21	1.83	10.23	3.59	2.39	17.15	4.77	1.39	13.22	1.27	1.01
1920	15.82	2.21	2.11	13.13	3.77	1.89	18.18	4.31	2.37	15.24	1.19	0.94
1921	13.32	1.54	1.78	11.80	3.29	1.85	13.07	3.42	1.68	16.61	1.19	1.18
1922	12.29	1.42	1.83	9.96	2.39	2.00	11.51	2.40	1.69	12.10	0.74	0.84
1923	12.46	1.26	1.52	9.48	1.93	1.48	10.53	1.45	1.41	11.36	1.73	0.58
1924	10.66	1.20	1.50	7.40	1.67	1.36	10.50	1.32	1.52	14.59	1.41	0.50

45.— *Vital statistics for the four large towns, Kuala Lumpur, Ipoh, Seremban and Taiping.*

Town.	Estimated population.	Births.		Deaths of persons who previous to decease had resided in town three months.	
		Number.	Rate per mille.	Number.	Rate per mille.
Kuala Lumpur	91,381	2,604	28.50	1,530	16.74
Ipoh	41,047	1,072	26.12	570	13.89
Seremban	20,074	507	25.26	348	17.34
Taiping	21,616	926	42.84	733	33.91

46.— *Table showing corrected death-rates in the four principal towns during the last seven years.*

Year.	Kuala Lumpur.		Ipoh.		Seremban.		Taiping.	
	Population.	Death-rate.	Population.	Death-rate.	Population.	Death-rate.	Population.	Death-rate.
†1918 ...	64,686	38.34	32,150	35.92	14,082	81.66	23,481	41.61
1919 ...	66,308	26.36	33,238	23.56	14,544	45.38	24,721	37.45
1920 ...	67,930	30.00	34,357	22.64	15,006	34.05	25,434	39.90
1921 ...	81,197	27.02	37,194	20.38	17,479	36.16	21,178	50.05
1922 ...	84,476	21.36	38,895	21.78	13,398	27.93	21,296	35.08
1923 ...	88,009	19.19	40,399	20.12	19,210	24.78	21,462	33.45
‡1924 ...	91,381	16.74	41,047	13.89	20,074	17.34	21,616	33.91

Calculated on a one month's basis as was done in previous years the rates for 1924 were: Kuala Lumpur, 18.07; Ipoh, 16.33; Seremban, 21.27; Taiping, 35.34.

* Influenza year, figures probably very inaccurate. † Influenza year. ‡ Calculated on a three months' residence basis.

47.— *Table showing corrected deaths and death-rates from principal diseases.*

Town.	Malaria.		Dysentery and diarrhoea.		Pulmonary tuberculosis.		Beri-beri.	
	Deaths.	Rate.	Deaths.	Rate.	Deaths.	Rate.	Deaths.	Rate.
Kuala Lumpur	103	1.13	140	1.53	243	2.66	12	0.13
Ipoh ...	40	0.97	41	1.00	62	1.51	4	0.10
Seremban ...	58	2.89	31	1.54	38	1.89	20	1.00
Taiping ...	117	5.41	78	3.61	94	4.35	1	0.05

48.— *Infantile Mortality Table.*

Town.	Births.	Deaths under one year.	Rate per 1,000 births.
Kuala Lumpur	2,604	442	169.74
Ipoh	1,072	126	117.54
Seremban	507	103	203.16
Taiping	926	171	184.67

49.— *Table showing corrected death-rates for principal diseases in the four towns for the last seven years.*

Year.	Kuala Lumpur.			Ipoh.			Seremban.			Taiping.		
	Malaria.	Dysentery and diarrhoea.	Pulmonary tuberculosis.	Malaria.	Dysentery and diarrhoea.	Pulmonary tuberculosis.	Malaria.	Dysentery and diarrhoea.	Pulmonary tuberculosis.	Malaria.	Dysentery and diarrhoea.	Pulmonary tuberculosis.
1918	6.08	4.05	3.43	7.52	3.85	4.72	40.83	10.01	3.48	22.32	2.63	2.03
1919	4.69	3.35	3.24	6.32	5.35	3.09	19.18	7.70	3.71	16.78	3.52	2.42
1920	5.08	2.49	3.48	5.64	2.64	3.75	8.99	5.00	3.40	19.14	2.99	1.57
1921	5.25	3.63	3.22	11.24	2.39	4.54	11.76	16.71	6.23	25.06	6.06	3.95
1922	2.79	2.18	3.33	4.50	1.62	2.54	10.44	5.92	6.35	5.45	1.50	1.74
1923	2.06	1.77	2.91	1.48	1.34	3.61	2.86	3.18	2.45	6.94	2.84	3.73
1924	1.13	1.53	2.66	0.97	1.00	1.51	2.89	1.54	1.89	5.41	2.91	3.47

MOSQUITO-BORNE DISEASES.

50. The mosquito-borne diseases of this country are malaria, filariasis and dengue.

51. Filariasis, namely, the pathological conditions due to the blockage of lymph channels such as elephantiasis, lymphangiectasis, orchitis, chyluria, etc., is comparatively rare in spite of the fact that the embryoes of filaria nocturna are not infrequently found in the blood of Asiatics.

52. Dengue is not a rare disease but being non-notifiable, statistics concerning it are not available. The term dengue probably covers several fevers of different origins.

MALARIA AND ANTI-MALARIA MEASURES.

53. Once again malaria easily heads the list as the most important cause of sickness and death

Under the Quarantine and Prevention of Disease Enactment the Resident of a State can declare malaria notifiable, and in many towns it has been so declared. Notification is practically confined to medical practitioners and officers in charge of hospitals. The chief value of notification lies in the clues afforded to the health authorities as to the existence of breeding places of malaria-carrying anophelines. Each case notified is made the subject of enquiries.

54. Proper statistics cannot be worked out on the notification figures for many cases are not notified at all and a considerable number of those notified are not confirmed by the microscope. It is becoming more and more evident that the microscope is only a confirming test for this disease and that the absence of parasites from the peripheral blood (especially when quinine has been taken) is no proof that the disease is not malaria. Such being the case comparative statistics must be based on the diagnosis "fevers" though it is realised that this diagnosis is not always correct for malaria.

55. The number of deaths registered as due to "fevers" was 14,283 or 42.53 per cent. of the whole. The death-rate was 10.07 per mille as compared with 11.17 for 1923. This year's rate is the lowest on record.

56. Malaria was an essential causative factor in many deaths attributed to other diseases. There is no doubt that the economic loss to the country from this disease is very great.

Malaria Prevention.

57. Experience gained during the year in no way tends to modify the view expressed in last year's report, that malaria prevention by anopheline reduction is (when done in the right way) a sound economic problem where persons are grouped together in towns, villages, or estates.

58. The Government's machinery for promoting efficiency in anti-malarial operation consists of the Malaria Advisory Board, the Mosquito Destruction Boards in co-operation with and assisted by the Health Department, the Malaria Bureau and the Anti-Malaria Engineer.

59. The Malaria Advisory Board is a Central Committee formed for the purpose of collecting information with a view to advising generally as to the methods which should be adopted for the control of malaria. The Principal Medical Officer is the Chairman of the Board and both officials and non-officials are represented on it. During the year the Board met regularly and its minutes were published.

60. The Mosquito Destruction Boards are local bodies with executive powers. Appointed by the British Resident for certain areas, they deal with the mosquito problems in their districts. Where possible the Chairman is the District Health Officer. The members comprise officials and non-officials. During the year each Board met as often as was necessary for the needs of its district. The executive staffs continued to perform good service. Minor works such as open ditching and oiling were carried out by the Boards staff under the supervision of the Chairman, major works such as sub-soil draining were for the most part performed by the Public Works Department under the supervision of the Executive Engineer who is ex officio a member of the Board.

61. The Health Officer, Railways, is ex officio a member of every Board through whose territories the railway runs. In this way close co-operation between the railway authorities and the district authorities has been secured.

62. Though good work has been done in many areas the scheme devised by the District Officer, Port Dickson, and carried out by the staff of the Mosquito Destruction Board, of which he is the Chairman, deserves special mention. By good organisation and strict attention to detail excellent results have been obtained. The success attained here is an example of what can be done by a layman, when the advice of a Health Officer is available and he has the proper staff at his disposal.

63. There can be no doubt that these Boards are of great value in keeping alive local interest in the mosquito problems and in spreading a knowledge of the nature of malaria and the manner of its spread.

64. The Health Branch is, of course, closely connected with these Boards. The Malay Lecturer, Haji Ismail, visited many districts and delivered lectures illustrated by lantern slides to the rural populations. Judging from the reports of the District Officers these lantern demonstrations were popular and well attended.

65. The Senior Health Officer did a large number of tests to determine the hydrogen ion in concentration of various waters harbouring anopheline larvae. With no exceptions the waters were either neutral or acid. No relation between the degree of acidity and the species of larva harboured could be detected.

66. The question of the comparative freedom from malaria enjoyed by dwellers in the great rice growing flats is being investigated by the Malaria Research Officer assisted by the Chief Sanitary Inspector of the Health Branch.

67. Apart from work in connection with the Malaria Advisory Board and the Mosquito Destruction Boards the anti-malaria activities of the Health Branch included the teaching of mosquitology, propaganda, investigation and quinine distribution.

68. The teaching of mosquitology continued throughout the year but was greatly hindered by lack of staff. Experience has shown that the Asiatic in general and the Malay in particular learns very little from posters and pamphlets unless these be supplemented by personal instruction. All the Inspectors are trained in both laboratory and field work and are competent to make accurate anopheline surveys.

69. The Health staff, Malaria Engineering staff and the Malaria Research staff worked in co-operation and were mutually helpful. The Senior Health Officer and the Anti-Malarial Engineer visited most of the Mosquito Destruction Board areas and conferred with the local authorities.

70. The free distribution of quinine continued to be carried out by the Health Branch. Tablets of quinine to the number of 1,105,000 were issued to the various Health Officers for ultimate distribution to the public through the Police, the Education Department and the District Officers; also to the Senior Medical Officers for distribution through the various travelling dispensaries.

MEASURES TAKEN FOR PREVENTING THE INTRODUCTION AND SPREAD OF INFECTIOUS AND CONTAGIOUS DISEASES.

Quarantine and Port Health Work at Port Swettenham.

71. During the year 27 ships with immigrant labourers were boarded and inspected. The labourers were landed at the Quarantine Camp. Of the 27 ships, 8 were infected—4 with chicken-pox and 4 with cholera.

72. The number of immigrants who entered the Quarantine Station, Port Swettenham, was 24,911, the number remaining on 31st December, 1923, was 1,097, making a total of 26,008. The largest number on any one day was 2,723 on 19th May, 1924.

73 Fifteen thousand three hundred and thirty immigrants received routine anti-ankylostome treatment.

74. Twenty-four thousand nine hundred and eleven immigrants were vaccinated during the year, of whom 6,098 failed and were re-vaccinated. One hundred and eighty-five passengers were also vaccinated.

75. The number of infectious cases were cholera 212, chicken-pox 22, measles 65, and cerebro-spinal fever 1. All these cases either came from ships or developed the disease in the Camp.

76. There was an outbreak of cholera during the first half of the year which claimed 83 deaths. The control of this outbreak was so satisfactory that the staff received the thanks of Government.

Camp Hospital for General Diseases.

77. During the year 1,200 immigrants and decrepits were treated in the hospital.

78. The total number of deaths among those quarantined was 155 or 0.62 per cent. Of these cholera was responsible for 83, pneumonia 29, broncho-pneumonia 16, and dysentery 9.

Infectious Diseases outside the Quarantine Camp.

79. The following table shows the cases of infectious diseases reported and the State in which they originated.

State.	Smallpox.		Cholera.		Plague.		Diphtheria.		Cerebro-spinal meningitis.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Perak	3	1	4	4	—	—	12	5	2	—
Selangor ...	1	—	—	—	—	—	27	10	4	3
Negri Sembilan...	2	—	—	—	—	—	3	2	1	—
Pahang	—	—	—	—	—	—	1	—	—	—
Total ...	6	1	4	4	—	—	43	17	7	3

80. There were six cases of smallpox reported. Owing to the care taken in vaccinating and isolating there was no spread.

81. There were four cholera cases in the district of Krian, Perak—all of which were fatal. Though all occurred in the same district no cause for infection was discovered. It is just possible that infection was brought from India on fruit.

82. Altogether there were forty-three cases of diphtheria and seventeen deaths. Most of the cases were sporadic and the source of infection was not discovered.

83. The number of deaths from dysentery and diarrhoea was 1,961, giving a death-rate of 1.38 per mille population, as against 2,142 deaths and a rate of 1.55 in 1923.

Pulmonary Tuberculosis.

84. There were 1,916 deaths from this disease as against 1,934 in 1923, giving a death-rate of 1.35 per mille population. The rates for all the four States were less than those for 1923, except Negri Sembilan which had a death-rate of 1.52 as against 1.41.

With regard to the four large towns the rates were down in Kuala Lumpur, Ipoh and Seremban, but up in Taiping.

85. *Helminthic Diseases.*—The only one of importance from a health point of view is ankylostomiasis. At least 90 per cent. of the population harbour ankylostomes but few show symptoms. All immigrants quarantined at Port Swettenham receive anti-worm treatment.

SCAVENGING, NIGHT-SOIL DISPOSAL, DRAINAGE, ETC.

Collection and Disposal of Refuse.

86. In most towns and villages under Sanitary Board control the scavenging is well done.

Disposal which is by incineration or dumping is more often than not unsatisfactory. Too often the method of disposal allows of fly-breeding.

Collection and Disposal of Night-soil.

87. No town in the Federated Malay States has a public water-carried sewage system. There are a number of private installations which are working well and that number is increasing.

88. The system in use in most towns is what is known as the bucket system with removal daily. There are however many houses in every town which have pit latrines—shallow, medium and deep. The shallow and medium types are very unsatisfactory in that they form fly-breeding areas. It was thought that deep latrines, where the excrement is in darkness would be fly-free. In quite a number of instances this has proved not to be the case. Probably the solution of the problem for bungalows is the provision of concrete septic tanks with an overflow into the drains. Given a tank of sufficient size there would be very little nuisance, probably none.

89. The ultimate disposal in the bucket system is by trenching. This, if properly done, is satisfactory—improperly done, a nuisance develops and fly-breeding areas are produced.

90. The Chinese set great store on human night-soil as a fertilizer for vegetables.

Drainage.

91. Street drainage is controlled by the Sanitary Boards. Anti-malarial drainage is controlled by the Mosquito Destruction Boards. As mentioned above, pipe draining is mostly done by the Public Works Department, open draining by the Board's staff.

Clearance of Bush.

92. Clearance of bush or undergrowth is done on public lands by the Sanitary Boards or Mosquito Destruction Boards. Owing to the fact that clearance of bush and undergrowth from wet hill-foots favours the propagation of *A. maculatus*, Malaya's most dangerous malaria-carrier, the Health Officers advocate no clearing in these situations unless after clearing the ground is drained and the drains rendered in such a condition as not to favour mosquito breeding.

In the coast lands where umbrosus is present, clearing rids the area of the species.

Water Supplies.

93. In the majority of cases towns are supplied with water from uninhabited catchment areas. In some cases filters are used, in others they are not considered necessary. Both slow sand filters and rapid mechanical filters are in use.

94. On estates conditions vary—some have well protected supplies, some have quite unprotected ones.

PUBLIC HEALTH EDUCATION.

95. In Kuala Lumpur there is a central body called the Public Health Education Committee whose duty it is to prepare and distribute information of a health character which may be useful to the public. Attempts are made to teach the public by lectures, lantern shows and exhibitions. Once a year there is a horti-agricultural exhibition which draws crowds from near and far. At this show pictures, posters, models, etc., etc., are exhibited and attendants are present to demonstrate.

96. At the 1924 exhibition there was an infant welfare exposition, an anti-malaria show, an anti-beriberi demonstration and a collection of exhibits on various health subjects.

97. Popular lectures on malaria, etc., are given at schools and kampongs.

General hygiene is one of the regular subjects taught in the schools.

98. It is realised that more instruction is necessary but more cannot be given without an increase in staff.

SCHOOLS AND SCHOOL INSPECTION.

99. The numbers of Government and State aided schools in the Federated Malay States are as follows:

Government English Schools	13
Aided English Schools	30
Government Vernacular Schools	418
	461

Besides the above there is a considerable number of private schools.

100. The duties of school inspection were shared with the Medical Branch. Altogether 251 visits of inspection were made by the Health staff.

101. Each school has a stock of Government quinine which is issued free of charge to those scholars who require it.

MATERNITY AND INFANT WELFARE.

102. The Infant Welfare Advisory Board met regularly during the year and its minutes were published.

103. The Infant Welfare Centre in Kuala Lumpur continued to do good work. The attendances steadily increased, and the old building became quite insufficient to deal with the work. New premises were erected.

104. In Ipoh an Infant Welfare Centre was started during the year. Already it has become popular.

105. Exhibitions and Baby Shows were held in Kuala Lumpur and Ipoh and both were great successes.

106. At present Government Infant Welfare Centres are under the Medical Branch but next year they will be transferred to the Health Branch.

107. The Chinese Maternity Association in Kuala Lumpur has so won the confidence of the people that its premises had to be extended. At the end of the year it was decided that even further accommodation must be provided.

108. The Perak Chinese Maternity Association continued to do excellent work. It is a model of its kind.

109. Both the Chinese Associations have a training school for midwives.

110. Maternity and Infant Welfare activity is not confined to the towns. Many estates have taken action in this direction.

WORK UNDER THE LABOUR CODE.

111. I repeat what I said last year—"One of the most important duties of the Health Branch is to co-operate with the Labour Department with the object of ensuring a reasonable standard of sanitation for those coming under the Labour Code."

112. The responsibility for the protection of health and the cure of disease lies with the employer of labour and it is his duty to engage the staff necessary for the purpose including a medical practitioner to advise in some cases, to supervise in others.

113. Under the Labour Code the duties of a Health Officer are chiefly those of an auditor. It is his business to visit estates sufficiently often, to keep in touch with what is going on and to report to Government whether or not the sanitary conditions prescribed by it for the protection of the health of the labourers are being carried out.

To audit properly it is necessary to visit good estates as well as bad, the only difference being that the audit of the former takes but a fraction of the time necessary for that of the latter. Nevertheless some time must be spent on supposedly good estates or the audit is worth nothing.

114. In the Federated Malay States there are now 1,403 estates sending in returns of sickness and death. For some years past insufficiency of staff rendered it impossible for the requisite number of visits to be paid to estates. This year owing to the reduction in the European staff of the Health Branch by the deletion of seven Chief Sanitary Inspectors the number of visits to estates had to be further curtailed.

115. There are a number of estates where health matters receive every care and attention but the majority cannot be included in this category. As a rule far too little attention is paid to insurance against disease.

116. During the year a Commission appointed by His Excellency the High Commissioner went into the whole question and issued a report.

ESTATES.

117. Details of the distribution of estates and estate hospitals and the frequency of visits by Health Officers is given below:

State.	Health districts.	Estates.			Estate hospitals.		
		No.	No. of visits by H.O.		No.	No. of visits by H.O.	
			1924.	1923.		1924.	1923.
Perak ...	Perak North	262	83	124	25	27	39
	Kinta	139	37	67	6	5	12
	Perak South	241	120	258	24	37	38
Selangor ...	Selangor East	220	49	219	23	15	53
	Selangor Coast	162	121	124	35	31	32
	Bernam	4	1	12	2	...	4
Negri Sembilan ...	All districts...	278	134	29	44	45	42
Pahang	All districts...	97	142	49	8	19	11
	Total, F.M.S. ...	1,403	687	882	167	179	231

Supplementary visits were paid by Sanitary Inspectors.

118. The distribution of labour was as follows:

		Indians.	Others.	Total.
Perak ...	Perak North	19,713	4,729	24,442
	Kinta	5,270	1,617	6,887
	Lower Perak and Batang Padang	19,817	2,345	22,162
Selangor ...	Kuala Lumpur, Ulu Selangor and Ulu Langat	15,350	3,787	19,137
	Coast	34,533	1,246	35,779
	Bernam	1,349	1	1,350
Negri Sembilan ...	All districts	17,009	12,010	29,019
Pahang	All districts	2,405	3,721	6,126
	Total, F.M.S. ...	115,446	29,456	144,902

119. The table below sets out the mortality rates among estate labourers during the past fourteen years, that is, since the Health Branch took over the supervision of health condition on estates.

Year.	Total number of estate labourers.	Deaths.	Death-rate per mille.
1911	143,614	9,040	62.9
1912	171,968	7,054	41.02
1913	182,937	5,592	29.6
1914	176,226	4,635	26.3
1915	169,100	2,839	16.78
1916	187,030	3,299	17.61
1917	214,972	3,906	18.71
* 1918	213,425	9,081	42.55
1919	216,573	3,384	15.16
1920	235,156	4,367	18.57
1921	175,649	3,195	18.19
1922	159,279	2,556	16.05
1923	147,276	1,924	13.06
1924	144,902	1,514	10.45

* Influenza year.

120. There were 1,316 deaths among the 115,446 Indian estate labourers during the year, giving a mortality rate of 11.40 per mille.

121. Return of malaria admissions and deaths of Indian labourers and others in estates and Government hospitals.

Divisions.	Malaria admissions to estates and Govt. hospitals.	Malarial deaths in estates and Govt. hospitals.	Total admissions to estates and Govt. hospitals.	Total labourers employed, all nationalities.	Total deaths.	Death-rate per mille.	Indians employed.	Deaths, Indian labour force.	Death-rates, Indian labour force.	Number of estates.	Number of estate hospitals.
Perak North ...	3,874	95	10,552	24,442	265	10.84	19,713	245	12.43	262	25
Kinta	739	17	2,247	6,887	60	8.71	5,270	56	10.63	139	6
Lower Perak and Batang Padang	2,156	60	9,983	22,162	157	7.08	19,817	145	7.32	241	24
Selangor East ...	2,619	73	6,866	19,137	189	9.88	15,350	176	11.47	220	23
Selangor Coast ...	2,636	106	12,442	35,779	312	8.72	34,533	309	8.95	162	35
Negri Sembilan	4 367	123	11,608	29,019	399	13.75	17,009	322	18.93	278	44
Pahang ...	1,767	37	4,357	6,126	128	20.89	2,405	59	24.53	97	8
Sabak Bernam ...	195	5	855	1,350	4	2.96	1,349	4	2.96	4	2
Total ...	18,353	516	58,910	144,902	1,514	10.45	115,446	1,316	11.40	1,403	167

Mines.

122. The average population engaged in mining during the year was 106,479 as against 96,662 in 1923 or an increase of 9,817, due probably to the high price of tin.

Mines are not required to send in sickness and death returns and the sick-rates and death-rates are not known.

No mines were visited.

Kuala Lumpur,
28th February, 1925.

A. R. WELLINGTON,
Senior Health Officer, F.M.S.

REPORT OF THE REGISTRAR-GENERAL OF BIRTHS AND DEATHS, FEDERATED MALAY STATES, FOR THE YEAR 1924.

1. Reports received from the State Registrars indicate that the Registration of Births and Deaths in each State is up to date.

2. The entries on the births and deaths registration forms being in the great majority of cases in Jawi Malay characters only and not in English as required by section 5—it was necessary to maintain in addition the old registration books and to make the entries therein in English, also to upkeep the old index books. Without such translations and arrangements the compilation of statistics would have been impossible.

3. After one and a half year's trial of the new Enactment, I have no hesitation in stating that instead of a decrease of work as predicted by the framer, there has been a decided increase, which has necessitated an increase in the clerical staff in each Registrar's Office.

4. With regard to the Registrar-General's Office the original pages of the registers were received as early as 1923, but were not filed properly owing to lack of clerical assistance. On 26th April, 1924, a second-grade Malay clerk was attached to this office and the work has been brought up to date.

5. The services of a bookbinder were requisitioned in September and since that time he has been continually employed.

6. Owing to the requisition by Government of the Senior Health Office (Office of Registrar-General) for a Federal Council Chamber a move was made in February to other and smaller premises. No accommodation having been provided for the clerks of the Registrar, Selangor, arrangements had to be made to accommodate them in the Senior Health Office which overcrowded before became more so after the move to new premises. Requisition has been made for increased accommodation for the Registrar, Selangor.

I attach to this report the estimated population figures and a summary of births and of deaths from principal diseases.

KUALA LUMPUR,
4th March, 1925.

A. R. WELLINGTON,
Registrar-General of Births & Deaths, F.M.S.

FEDERATED MALAY STATES.

ESTIMATED POPULATION FOR 1924 OF ALL RACES OF EACH STATE AND FOR THE WHOLE OF FEDERATED MALAY STATES.

States.	Europeans and Americans.	Eurasians.	Malays and other Natives of the Archipelago.	Chinese.	Indians.	Others.	Total.
Perak	2,258	1,019	252,156	226,984	148,777	1,985	633,179
Selangor	2,831	1,707	100,508	177,115	151,550	2,064	435,775
Negri Sembilan ...	1,054	533	80,219	73,078	38,668	993	194,545
Pahang	324	126	107,182	37,295	9,368	661	154,956
Total, F.M.S. ...	6,467	3,385	540,065	514,472	348,363	5,703	1,418,455

SUMMARY OF BIRTHS AND DEATHS FOR THE YEAR 1924.

BIRTHS.

States.	Europeans and Americans.	Eurasians.	Malays and other natives of the Archipelago.	Chinese.	Indians.	Others.	Total.	Rate per mille of population.
Perak	40	35	9,158	5,026	3,177	46	17,482	27.61
Selangor ...	64	65	3,892	3,911	3,917	19	11,868	27.23
Negri Sembilan	3	25	3,231	1,244	793	2	5,298	27.25
Pahang ...	5	1	3,940	748	167	3	4,864	31.39
Total, F.M.S.	112	126	20,221	10,929	8,054	70	39,512	27.86
				DEATHS.				
Perak	15	12	5,641	5,505	3,538	57	14,768	23.32
Selangor ...	17	22	2,023	4,194	3,032	83	9,371	21.50
Negri Sembilan	3	8	2,207	1,498	1,157	10	4,883	25.10
Pahang ...	1	3	3,314	908	330	7	4,563	29.45
Total, F.M.S.	36	45	13,185	12,105	8,057	157	33,585	23.68

FEDERATED MALAY STATES.

RETURN OF DEATHS FROM PRINCIPAL DISEASES FOR 1924.

	Plague.	Cholera.	Smallpox.	Cerebro-spinal meningitis.	Diphtheria.	Typhus.	Yellow fever.	Malaria fever (including fever).	Blackwater fever.	Dysentery and diarrhoea.	Phthisis (pulmonary tuberculosis).	Pneumonia.	Beri-beri.	Enteric (typhoid).	Syphilis.	Ankylostomiasis.	Tetanus.	Cancer (including Sarcoma).	Bright's disease.	Influenza.	Ptomaine poisoning.	Convulsions.	Deaths from other diseases.	Children under one year.	Persons between 20-40.	Persons over 60.	Persons of other ages.	Total.
Perak	...	4	1	...	5	...	...	6,752	...	760	951	587	93	19	47	107	50	10	15	21	74	1,446	3,826	2,767	3,722	1,896	6,383	14,768
Selangor	...	...	...	3	10	1	...	3,228	1	726	592	729	141	10	26	71	74	6	52	23	71	984	2,623	2,040	2,812	899	3,620	9,371
Negri Sembilan ...	...	...	...	...	2	...	...	2,042	...	257	295	258	130	7	12	59	2	16	82	11	5	629	1,076	1,091	1,314	457	2,021	4,883
Pahang	...	...	...	...	...	...	...	2,261	...	218	78	114	89	4	...	20	4	2	2	6	3	560	1,202	1,235	856	433	2,039	4,563
Total, F.M.S. ...	...	4	1	3	17	1	...	14,283	1	1,961	1,916	1,688	453	40	85	257	130	34	151	61	153	3,619	8,727	7,133	8,704	3,685	14,063	33,585

ANNUAL REPORT OF THE CHIEF SURGEON, PERAK.

A large increase in surgical work performed during the year is to be recorded, and gratifying results have been obtained:

Major Operations.—

The total number of major operations performed in Ipoh Hospital	169	
This shows an increase of *51 per cent. over 1922* and *20 per cent. over 1923.* The respective figures for these years being	111 & 140	
These figures are exclusive of ophthalmic cases.		

Mortality, 1924.—

Total deaths following major operations	23	
Percentage of deaths to operations as compared with ...	13.69	per cent.

1922 and 1923.—

Twenty-one per cent. for 1922; 16 per cent. for 1923.

Emergency Operations.—

Total number of emergency operations	43	
Total deaths of emergency operations	19	
Percentage of emergency operations	44.18	per cent.

Interval Operations.—

Total number of interval operations	125	
Total deaths of interval operations	4	
Percentage of interval operations	3.2	per cent.

Minor Operations.—

Performed in the casualty room	526	804
Performed in theatre	278	

Total Operations.—

Total operations of all kinds performed in Ipoh Hospital ...	973	

Admission to Hospital.—

Total surgical admissions all conditions	2,327	
Total deaths to admissions	57	
Percentage of deaths to admissions	2.45	per cent.

OPERATIONS PERFORMED IN OTHER HOSPITALS.

Kuala Kangsar.—

Gastro-enterostomy	Cured
Exploratory laparotomy	,,
Removal of astragalus for osteomyelitis	,,

Batu Gajah.—

Excision of inguinal glands	,,
Cholicystectomy	Died
Cholicystectomy	Cured
Carcinoma of lip, plastic operation	,,
Plastic repair of abdominal wall	Died
Appendicectomy (2)	Cured
Excision of chronic quinine abscess (2)	,,
Radical cure mastoid disease	,,
Gastro-enterostomy for pyloric obstruction	,,
Gastro-enterostomy for cancer	Died

Taiping.—

Appendicectomy	Cured
Exploratory laparotomy	,,
Amputation of thigh	Recovered
Fistula in ano—very extensive	Cured
External urethrotomy for extensive stricture	,,
Hernia inguinal	,,
Hernia inguinal	,,
Resection of ribs	,,
Inguinal hernia	,,
Total ...	24

Total Major Operations for Perak.—

Total Major operations performed by me in Perak for 1924	193
Percentage of surgical beds occupied during year (daily)	99.8 per cent. estimated

Visits paid to Hospitals.—

Taiping	10 visits
Batu Gajah	44 ,,
Kuala Kangsar	6 ,,
Kampar	3 ,,
Tanjong Rambutan	2 ,,
Telok Anson	1 ,,
Gopeng	1 ,,

Miles travelled.—3,363 miles.

CAUSE OF DEATH FOLLOWING MAJOR OPERATIONS.

Nature of operation.	Cause of death.
Strangulated inguinal hernia (3) ...	Toxic absorption and shock
Perforated and gangrenous appendix, laparotomy	General peritonitis
Abdominal tumor, laparotomy (inoperable)	Cancer
Tracheotomy	Malignant disease larynx
Tracheotomy	Diphtheria
Acute general peritonitis, laparotomy	Toxic absorption
Cancer of breast, removal of ...	Secondary cancer of lung
For compound dislocation ankle and fractured thigh	Shock
Intestinal obstruction (2), laparotomy	Toxic absorption, shock
Appendix abscess, laparotomy ...	General peritonitis
Gangrene of gall bladder, removal of	Toxic absorption, peritonitis
Stab wound of abdomen, injury to intestine and left kidney, laparotomy and nephrectomy	Haemorrhage, shock
Compound fracture of skull, trephining and decompression	Compression of brain
Amputation of leg (2), gross injuries	Septic poisoning and shock
Laparotomy for general peritonitis	Toxic absorption
External urethrotomy	Acute septic poisoning
Intussception (Resection for gangrene)	Acute septic absorption
Resection of ilium for perforation ...	General peritonitis
Ruptured uterus panhysterectomy ...	Shock

DIGEST OF OPERATIONS ACCORDING TO REGION.

Head and Neck.—

Mastoiditis—radical operation	5
Necrosis of jaw—sequestrectomy	1
Removal of enormous post nasal polyp (carcinomatous elements found in)	1
Tracheotomy	2
Removal of lower jaw for cancer	1
Trephining skull	1
Removal of large dentigerous cyst, lower jaw	1
	12

Thorax.—

Empyema—resection of rib	1
Excision of cancerous breast	2
Removal of breast cystic tumor (sebaceous)	1
Removal of tubercular glands with abscess extending into breast tissue	1
	5

Upper Limbs.—

Removal of sarcomatous tumor axilla	1
Amputation of hand	1
Resection of left elbow joint	1
,, right shoulder joint	1
	4

Abdomen.—

Appendix abscess	1
Abscess, abdominal wall	1
Acute appendicitis (appendicectomy)	3
Exploration abdominal wound	3
Gastro-enterostomy	20
Hernia, inguinal	26
,, obstructed	2
, strangulated	5
,, ventral	1
Removal of tumor from abdomen	1
Laparotomy for—	
General peritonitis	5
Cancer of stomach	1
Perforation of intestine	2
Removal of retroperitoneal tumor	1
Extravasation of urine into space of ritsins	2
Intestinal obstruction	4
Perforation of appendix	1
Removal of gangrenous gall bladder	1
Exploratory laparotomies	6
Drainage of perforation of sigmoid	1
Removal of piece of metal from liver	1
	88

Pelvic.—

Amputation of gangrenous penis and formation of perineal urethra	1
Removal of external and internal haemorrhoids	1
Radical cure hydrocele	3
Iliopsoas abscess	1
Imperforate anus	1
Prolapse uterus ventral suspension	1
Removal of enormous elephantiasis of vulva	1
,, large ovarian cyst	1
,, parovarian tumor	1
,, tube for ectopic pregnancy	3
External urethrotomy	8
Extensive radical cure for fistula in ano	1
Pan-hysterectomy for ruptured uterus	1
Removal of parovarian cyst	1
,, very large ovarian fibromyoma	2
	27

Lower Limbs.—

Amputation of leg	7
,, great toe	1
Periarterial sympathectomy	6
Elongation of tendo achilles	1
Fracture patella, wiring of	1
Condeleon operation for elephantiasis of leg	1
Plating compound fracture	3
Osteotomy for osteo-myelitis	3
Plastic operation on heel and repair of tendo-achilles	1
Drainage of septic knee joint	1
Reduction dislocation of hip and fracture of clavicle	1
Reduction of compound fracture, dislocation of ankle and fracture of thigh	1
Reduction of dislocated hip	1
Reduction of compound dislocation and compound fracture of tibia and fibula	1
Reduction of compound fracture tibia	1
Ligature of femoral artery for popliteal aneurism	2
	33

Deaths other than post operative.	Cause of deaths.
Cerebral abscess	Meningitis
Acute general septic intoxication large abscess thigh	Pyaemia
Lacerated wound	Sepsis acute
Extensive cellulitis	,, ,,
Erysipelas	,, ,,
Chronic ulcer (2)	Septic absorption
Cancrum oris	,, ,,
Otitis media acute	Meningitis
Compound fracture of skull	Shock, compression of brain
Burns (2)	Shock
Fracture of ribs	Rupture of lung
Vincents angina	Sepsis
Cellulitis of scrotum	,, and mitral valve disease
Fracture of lumbar spine	Injury to spinal cord
Extensive compound fractures involving entire thigh (2)	Shock

REMARKS ON SURGICAL CONDITIONS MET WITH.

Gastric Conditions.—A large number of interesting cases were met with, and the operative experience gained has been considerable, more especially in gastric-intestinal conditions.

No less than 21 gastro-enterostomies were performed, viz.:

Four for gastric ulcer.

Six for duodenal ulcer.

Eleven for ulcer and obstruction of the pylorus.

In all cases, marked improvement was noted subsequent to operation; viz., absence of pain, haemorrhage and vomiting; steady and maintained increase of weight.

Of the 21 cases seen 20 left hospital apparently cured; and able to resume their occupations. The average period in hospital being five weeks.

The greatest increase in weight noted was in a Chinaman with duodenal ulcer—on admission he weighed 4 stones 11½ pounds and on discharge 6 stones 8 pounds. The lowest weight increase noted was in the case of another Chinaman with gastric ulcer. On admission he weighed 7 stones 5 pounds and on discharge 8 stones. The average increase in weight for all cases was 18 pounds.

One case of advanced gastric ulcer, complicated with extensive adhesions, had an anterior gastro-enterostomy, and enters-enterostomy performed. He progressed very favourably for five days, but on the sixth he for some reason tore open his abdominal wound. He was an old man 76 years of age, and suffering from senile dementia.

It was an excellent opportunity of observing the result of the operation. The ulcer appeared to have diminished in size—the gastro-enterostomy showed perfect union and function. Unfortunately he subsequent to secondary closure of his abdomen developed bronchitis and died.

It was notable that in no case was post-operative vomiting in any way troublesome, a tribute to the anaesthetists and the anaesthetic—O.E. and E.C.

Pre-operative preparation was most thoroughly and carefully carried out in every case, and to this I attribute no small measure the success obtained.

I feel convinced that these results, in so far as more or less broken down Orientals are concerned, justify fully the performance of posterior gastro-jejunostomy in preference to the more drastic gastrectomy or pylorectomy combined with anastomosis.

Gangrene of the Penis.—One remarkable case of gangrene of the entire penile-portion of the penis was met with, this was brought about by the application of "Chinese medicine" to cure a gonorrhoea. The penis dropped off at the pubis. An artificial urethral opening was made in the perineum and the patient left hospital cured in so far that a urinary passage was provided.

With regard to the hernial conditions:

Hernial Conditions.—The urinary bladder was met with, and recognised in three cases. In one of these containing omentum the entire bladder was demonstrated inside the sac.

One case of ventral hernia also contained the entire urinary bladder—this hernia was secondary to a cystotomy for calculus. The cystotomy was performed five years previously in Penang. An extensive plastic operation was performed and the patient left hospital with a strong and firm abdominal wall.

Extra Peritoneal Rupture of Bladder.—Two cases of apparently spontaneous extra peritoneal rupture of the bladder were seen—all cases were operated upon and all recovered.

Pelvic Conditions, Female.—In pelvic conditions seen.

Three cases of ectopic gestation were met with, operated upon and all recovered.

Portion of Motor Cycle Spoke in Liver.—A very remarkable case of a piece of steel 4″ long—obviously portion of a motor cycle wheel spoke, accidentally driven into the liver—two years prior to admission to hospital—was operated upon. The reason for admission was a discharging sinus situated between the 6th and 7th ribs and 3″ to the right of the sternum. An X-Ray photo clearly showed the foreign body. The sinus was freely opened up and at its base the tip of the portion of steel was felt and seen it was easily extracted.

The X-Ray photo and foreign body were presented to the College of Medicine, Singapore. The patient made a rapid recovery.

Periarterial Sympathectomy, Remarks on.—Periarterial sympathectomy was performed on six occasions, for trophic ulcers of the feet. The results were remarkably favourable, healing occurring in all cases within three weeks.

This operation is generally performed on the femoral artery at the apex of scarpa's triangle for trophic ulcers of the feet. The details of the operation are simple, the artery is exposed, lifted by two blunt hooks from its sheath and the adventitious coat dissected off its entire circumference for about one inch. A very steady hand is needed as the dissection is a delicate one. I have discarded using a sharp pointed knife, there being a very real danger of puncturing the artery should the patient move or one's assistant's hands shake, I now use a narrow bladed knife with a blunt point and mosquito dissecting forceps. It is an operation which deserved wide publication, and when applied to suitable cases gives most gratifying results. I have not found it of much service in ordinary chronic ulcers of the leg.

The result of the sympathectomy is to cause an immediate shrinking of the artery at the site of operation, soon followed by a marked rise of temperature in the affected foot and the engorgement with blood. Within 48 hours healthy granulations can be seen springing up and healing progresses very rapidly.

The rise of local temperature lasts for about three weeks.

I do not apprehend any danger from aneurismal formation as has been suggested.

THEATRE.

During the year a new operation table has been obtained, and has more than repaid its cost.

A number of modern electrical instruments have been added, and have been found most useful.

Theatre, Unhealthy Conditions of Work.—An exhaust electric fan was experimentally fitted, in an endeavour to reduce the very high temperature of the theatre which has proved most exhausting to all. The fan was proved useless, and has been removed. The highest temperature recorded was 95° F., the lowest 78° F. The average 88° F.

Furthermore, owing to defective ventilation, fumes of chloroform and ether remain, and their continual absorption is very detrimental to the health of the operator and his assistants.

The theatre in my opinion has been faultily planned, and nothing will improve matters short of a new and properly constructed building.

I beg to impress upon the authorities, the unhealthy, and exhausting conditions, under which work has at present to be carried out, and to urge early construction of a suitable building.

SURGICAL WARD.

A pressing need is the supply of modern beds to replace the present out-of-date plank ones. The surgical department is rapidly expanding and warrants this. I mentioned this last year but no move has taken place.

Washing Facilities in Theatre.—Still very defective and no improvements have as yet been carried out.

Staff.—My staff worked exceedingly well during the year, and the system now in force of giving all Senior Dressers thorough training in surgical and theatre work has proved highly satisfactory.

I should very much like to see some of the female nurses given theatre training and trust that when possible this may be carried out.

Teaching.—Several complete courses of surgical lectures and demonstrations were given and were well attended. Special attention was given to probationers.

IPOH,
20th January, 1925.

C. B. PASLEY, F.R.C.S.I.,
Chief Surgeon, Perak.

ANNUAL REPORT OF THE INFANT WELFARE CENTRE, KUALA LUMPUR, SELANGOR.

INFANT WELFARE CENTRE, SULTAN STREET.

This Centre, the first in Kuala Lumpur, was opened in July, 1922. The work was first carried on in two rooms of a Chinese dwelling-house.

Additions to the buildings of the Centre were completed in December, 1924. These additions include a large waiting room for patients, a consultation room, a room for weighing and one for the treatment of minor ailments. The two rooms of the old building are now used, one as a Sisters' Office and the other as a lecture room for Health Visitors.

This increase in accommodation means more comfort for the mothers and babies and permits of extension and development of the work of the Centre in many desirable ways. It may be added that it also provides more space for the umbrella, the basket with cock and hens, and the husband—accessories which invariably accompany the patient. None of them, or so I am told, can safely be left behind because of the thieving propensities of the neighbours. They are placed in this order of value by the mother; she would rather lose the husband than lose the umbrella.

Staff.

The staff of the Centre is as follows:

One Lady Medical Officer;

Two European Nursing Sisters;

Four Health Visitors.

Duties of Staff.

The Centre started with a part time Medical Officer, one European Nursing Sister and one Health Visitor. Additional staff with a whole time Medical Officer became necessary owing to the increase in work.

The Medical Officer's duties are directed entirely to medical work; (*a*) the examination of mothers and infants, (*b*) advice to mothers about their own and their infants' health, and (*c*) instructions to Health Visitors in the care and management of individual cases.

The European Sisters are fully qualified Nursing Sisters with special training and experience in Infant Welfare and Maternity Work. Their duties include the training of Health Visitors, supervision of the work of home visiting and advising mothers with respect to details that are not purely medical.

The Health Visitors are locally qualified Nurses who have been trained in home visiting at this Centre.

Work at the Centre.

The Centre is primarily an educational institution. It provides advice and teaching for young mothers of all nationalities in the care and management of their infants with a view to maintaining them in good health. The work of the Centre is directed rather to the supervision of the healthy infant and the education of the mother, than to the treatment of the sick, but here the incidental treatment of simple ailments is included within its scope.

At the morning and afternoon sessions simple explanations of the posters on the wall are given to groups of mothers. These posters are printed from photographic enlargements of scenes of native life—Malay, Chinese and Tamil—and are designed to fit in with the teaching on mothercraft. At first European posters only were available but the native mothers found these difficult to understand.

Practical demonstrations are given in the washing of bottles and teats and the care of these when not in use, also in the bathing and dressing of an infant.

The mother is also taught individually and given any special advice she may need regarding her own infant and any minor ailment for which it has been treated. Experience has shown that these people have to be taught carefully and patiently and very little at a time. Their brain works slowly but the majority are quite willing and anxious to learn. One Tamil mother said she was too poor to buy a clock but that her Chinese neighbour had one which she could hear strike. With the characteristic toss of her head she said she would feed her baby as we had told her, at regular hours. She did so and the baby's weight as shown by the weighing card rose steadily and its digestion became normal in a short time.

There is one regular weighing day a week at the Clinic but mothers bringing babies from outlying districts and kampongs may have them weighed any day, as it is not always easy for them to get to the Clinic on the recognised day. Great difficulty was experienced at first about weighing. The Chinese and Malays were very superstitious about it, fearing that some dreadful misfortune would befall the baby. However they are gradually overcoming such beliefs and provided there is no fan anywhere near, that might blow the baby away, that the Sister or Nurse who does the weighing is one they recognise as a member of the staff, they willingly submit but they are very reluctant to allow a stranger to touch the baby.

Another difficulty was experienced in getting them to believe in the necessity of a daily bath. The mothers generally wash the infant in "bits", the face coming in for the most attention. Soap and warm water they never use. They have a strong objection to completely undressing an infant and never will they remove a charm, which is as a rule far from clean. One afternoon a Chinese mother very poor, brought a rather fine but dirty baby. She removed the clothes but not the charm saying that when the child was young, it was very ill, that a neighbour gave her the charm which she hung around the baby's neck, and that the next day the child was better and had not been ill since. She would do anything we wished short of removing the charm. The charm in this case proved to be a dog licence bearing the inscription "1915. Selangor, one dog. 1669".

Instructions in feeding the baby at regular intervals presented less difficulty than I had imagined there might be. The Chinese understand clocks and nearly all of them have one in their homes. Some Malays and a few Tamils are equally intelligent but to the greater number the advice "Feed your baby by the clock" conveys very little. It has to be simplified and explained by means of a clock face over and over again but once they have grasped what it means, they value it more than any of the other teaching. They realise that in the end it means much less trouble for themselves and also better health for the baby.

Ante-Natal Works.

The work of the Ante-Natal Clinic includes the advising of expectant mothers in matters relating to their health, not only with regard to conditions directly associated with pregnancy but also with regard to general ailments.

Many of the mothers are now beginning to realise the importance of a medical examination during pregnancy and attend the Centre for this purpose. The object of the examination is explained to them, namely, to detect early symptoms of disease or physical defects that may interfere with a successful delivery or result later in injury to the health of mother or child. Weekly consultations are held at the Clinic and patients attend at regular intervals until their confinement.

In connection with this work microscopical examinations of the blood, chemical examination of the urine, and the simpler laboratory tests are undertaken at the Centre itself. Specimens for serological tests, such as the Wassermann reaction, and for bacteriological examination and sent to the Institute for Medical Research.

The number of expectant mothers attending the Ante-Natal Clinics during 1924 was 142 as compared with 51 in 1923.

Venereal Disease.

Special attention has been paid to the diagnosis and treatment of venereal diseases in pregnant women and to the investigation of the relative importance of this factor in the causation of abortion and still births.

Ante-natal care serves to prevent the occurrence of ophthalmia neonatorum and it has also given remarkable results in ensuring the birth of healthy infants, who would probably otherwise have suffered from congenital syphilis. The following example is taken from the case records at the Ante-Natal Clinic and shows the importance of this branch of the work:

Ah Moi, Chinese (23), married five years, three stillborn children. First visit to Clinic 15th November, 1923, four months pregnant. Came because she "wanted to have a live baby".

Blood examination: Wassermann test—Kahn's test. Course of injections of sulpharsenol administered.

On 3rd March, 1924, blood again examined. Wassermann test—Khan's test. Injections of sulpharsenol continued.

Healthy baby born 21st April, 1924, and won first prize at the baby show in the following July.

Emergency Work.

Owing to its situation in the more densely populated part of the town, the staff of the Centre are sometimes called upon to deal with accidents and other emergencies.

In December a baby was born there. The mother was on her way to the Chinese Maternity Hospital when labour came on. She was brought to the Centre and some hours later was sent on to the hospital with her baby.

Record of Attendances.

Infant Welfare Centre.

1924.	Infants.	Children.	Women.	Totals.
January	578	284	406	1,268
February	475	221	268	964
March	546	287	366	1,199
April	643	270	344	1,257
May	845	284	359	1,488
June	749	245	352	1,346
July	919	251	359	1,529
August	758	200	339	1,297
September	854	312	312	1,378
October	1,014	258	334	1,606
November	966	312	305	1,583
December	759	269	295	1,325
Totals	9,106	3,193	4,039	16,238
1923.				
Totals	5,777	2,872	3,559	12,208

Record of Attendances by Nationalities.

1924.	Chinese.	Tamils.	Malays.	Others.
January	945	227	28	68
February	554	328	33	49
March	871	216	35	77
April	905	242	36	74
May	990	298	68	132
June	976	280	36	54
July	993	333	57	146
August	949	236	32	80
September	986	301	40	51
October	1,137	311	73	85
November	1,023	345	103	112
December	971	252	41	59
Totals	11,300	3,369	582	987

Grand total ... 16,238.

Health Visiting in the Homes.

A list of the births notified is sent weekly to the Centre by the Chief Police Officer, Selangor. The lists are examined by the Medical Officer, and the Sister on duty in the district allots to Health Visitors cases in special areas.

The work of the Health Visitors lies mainly in the homes though an occasion they assist at the Infant Welfare Clinic. They follow up every notified birth, instruct the mother in infant management, and encourage her to visit the Centre. They keep a record of their work and report daily to the Medical Officer.

Cases of puerperal sepsis and post-puerperal beri-beri are visited daily by the Medical Officer and the Sister-in-Charge of the district.

It is a remarkable fact that the prejudice against the invasion of the home by strangers which was commented on in my last annual report has already entirely disappeared. The Health Visitors without exception are very well received, even by the old militant grandmother, and not a day passes at the Clinic that some poor man or woman does not come for advice and help. A certain amount of difficulty is still experienced in finding some of their houses. In Kuala Lumpur it is comparatively easy as the houses are numbered and if one gets the wrong number the right one is not very far off, but, when it comes to address like "Liow Moy, vegetable grower, 3rd mile, Cheras Road," or "Francis, clerk, Tamil, attap house behind Pudu town," it is not quite so easy. It sometimes means spending a whole morning before the baby is discovered, perhaps then to find it has been removed by the mother-in-law to her house some miles distant. To find houses in the kampongs is comparatively easy now, as the Health Visitor is known and every help is given her to find the baby. The Malays are particularly good about this and will if necessary take part in the search, sometimes wandering from one end of the kampong to the other with the Health Visitor. The Chinese vegetable gardeners are more difficult to find as they generally live in remote districts, difficult of access. The Nurse very often has to walk a mile or more along a bridle-path crossing streams and broken-down bridges and perhaps encountering several wild looking dogs before she finds the baby. Moreover the Chinese vegetable gardeners cannot help one another as do Malays owing to the fact that their houses are considerable distance apart. Experience has shown us that the mothers who are most difficult to find are generally the poorest and who most need help and advice. She is generally all alone with small children and is utterly beyond aid of any kind in ante-natal and post-natal periods. Every endeavour is therefore made to find such people though it may take days to do so.

Health Visiting in the homes has proved invaluable in bringing mothers and babies from remote kampongs and districts to the Centre. It has been specially helpful with Malays as some of their kampongs are far off and many of them are too poor to pay rickshaw fares. This applies also to the Chinese vegetable gardener mother who very often has one baby strapped in front, one on her back and a small child by the hand; she cannot possibly walk to the Centre and she is very poor. The motor-bus calls every morning at various outlying points to collect these mothers and babies, the Health Visitor having previously informed them to be ready at the appointed hour. At first there was considerable difficulty in getting Malays to the Centre but when transport became available the record of their attendances rose steadily.

Great credit is due to Miss Dunsmore (now Mrs. Johnson) and Mrs. Bun for their pioneer work in the organisation of health visiting in Selangor.

HEALTH VISITORS' VISITS TO HOMES.

January	272
February	237
March	337
April	457
May	574
June	650
July	594
August	1,090
September	1,507
October	2,267
November	1,140
December	1,407
Total	10,532

MOTHERS CONVEYED BY AMBULANCE.

	Brought to Centre.	Taken to hospital.
October	371	26
November	143	36
December	48	44
	562	106

Education and Propaganda.

Apart from the Infant Welfare Centre itself and the daily instructions given, there the most valuable propaganda work undertaken during the year was the Infant Welfare Exhibit and the baby competition at the Malayan Agri-Horticultural Exhibition held at Kuala Lumpur in July. The exhibit was prepared by the staff of the Infant Welfare Centre assisted by Captain Hoflin; they also attended daily and gave demonstrations. Large numbers of Asiatics of all classes visited the exhibit and displayed the keenest interest in it.

Later in the year the models, posters, and specimens shown at Kuala Lumpur in July were sent to Ipoh and shown at a first Infant Welfare Exhibition there.

A catalogue of the exhibits with some notes on the instruction given in connection with them will be published by the Infant Welfare Advisory Board.

The baby competition was the first of its kind in the Federated Malay States. It took some months to get the mothers to understand what a baby competition was, to assure them that there was nothing evil about it and that no harm would befall the baby. It was explained to them that the object was to give a prize to the finest baby of each nationality and that the finest baby must have had a good mother to look after it, one who was quite clever about babies. At first the entries were very few but as time went on more and more entered and eventually they numbered 240. There were entries from estates in Perak and Negri Sembilan as well as from Selangor.

An advertisement was inserted in all the English, Chinese, Malay and Tamil newspapers twice a week for two months before the competition and cards of admission were given free to mothers. Copies of these are shown in an appendix to this report.

The baby competition was a great success and proved to be the most useful propaganda work so far undertaken.

Acknowledgments.

I am again indebted to Mr. C. P. Cuscaden, Chief Police Officer, Selangor, for the efficiency of the arrangements which ensure prompt notification of births; to the staff of the Surveyor-General's Office for assistance in the preparation of propaganda posters; and to Captain J. W. Hoflin, Secretary of the Infant Welfare Advisory Board, for much help in many ways. The constant interest shown by the Acting Senior Medical Officer in this new branch of medical work in Selangor has greatly lightened my task. In the laboratory diagnosis of difficult cases members of the staff of the Institute for Medical Research have given me valued assistance.

Infant Welfare Centre, Kuala Lumpur,
2nd February, 1925.

M. JOSEPHINE WERE,
Lady Medical Officer.

ANNUAL REPORT OF THE INFANT WELFARE CENTRE, IPOH.

The Infant Welfare Centre and Clinic for Mothers was reopened in April, 1924.

STAFF.

1 Lady Medical Officer;
1 European Nursing Sister;
1 Health Visitor;
1 Amah;
1 Punkah-puller.

Dispensing was done by the Dresser-in-Charge of the Town Dispensary assisted by an attendant.

PREMISES.

The work has been carried on in the Ipoh Town Dispensary, a shop-house containing two small rooms. Obviously this accommodation was quite inadequate for dispensing, for examining and treating the women and children as well as the men.

The adjoining similar shop-house has been taken over and is being converted into suitable rooms for Infant Welfare work. This, with the original, provides:

1. Waiting room;
2. Office and examination room;
3. Exhibition and demonstration room;
4. Dressing room;
5. Dispensary.

Although this new series of rooms will be the most satisfactory that can be arranged from the material and space at our disposal, yet they should be regarded as strictly temporary if the Infant Welfare work and Ante-Natal care is to be expanded as much as is hoped for in the immediate future. A new site has been suggested which I understand the Hon'ble the British Resident, Perak, is trying to acquire, on which to erect a new and model building for our purpose, to be ready, it is hoped, within two or three years.

The first floor of the original shop-house is used as quarters for the Dresser-in-Charge, Town Dispensary.

The corresponding first floor of the extension is being arranged to accommodate two Health Visitors. As regard the progress of the work, this has been, considering the various disabilities under which we have had to proceed, very satisfactory as will be seen by the figures for the year (and as shown by the intense interest displayed in the recent Infant Welfare Exhibition and Baby Competition).

The number of attendances, which were considerably under 500 in April, increased to just over 1,300 in December. The majority of cases are medical but there is a steadily increasing number of parents who bring their infants simply for our inspection and advice and to have them weighed. The superstition that it is unlucky to weigh a child is slowly being overcome, especially now that the Infant Welfare Centre has numerous cases with which to point the moral.

It is interesting to scan the list of figures showing the number of cases per month in which no disease was discoverable in the infant, and in which the complaint has been cured by correcting mismanagement of feeding and general care. These figures do not include the grosser effects of mismanagement of diet such as constipation, diarrhoea, vomiting, etc.

ATTENDANCES AT THE BABY CLINIC.

April	4
May	22
June	30
July	46
August	46
September	110
October	120
November	131
December	107

The Weight Clinic itself is gaining in popularity. The number of new cases was 309.

Ophthalmia Neonatorum.—Considering the incidence of venereal disease in the mother, comparatively few cases of ophthalmia neonatorum have been seen at the Infant Welfare Clinic.

Cases brought to the Centre or suspicious cases seen while visiting are sent immediately to hospital and the dangers of the disease explained to the parents.

Ante-Natal Clinic.—Expansion in this direction must necessarily be slow considering the amount of superstition one has to overcome before the Asiatic women will come voluntarily for examination and treatment unless they are actually ill. Most of the cases attending the Clinic have been enrolled while visiting the Centre with a sick member of the family or a sick friend.

However, the numbers are increasing and several of these women have been persuaded to attend regularly and later to enter hospital for confinement.

The complete examination and treatment of women, pregnant or not, for venereal disease is carried out at the District Hospital where a weekly Clinic is held for the purpose.

It is hoped that it will be possible to make full examination of these women at this Centre as soon as the extension of premises is complete.

The Health Visiting.—This very important branch of our work is progressing as satisfactorily as can be expected as there is only one Nurse both to do the visiting and to assist at the Welfare Centre. Notifications of births are sent regularly by the Police and the cases are visited as early as possible by the Sister and the Health Visitor. Although the visiting by the Sister and Health Visitor has proved to be most valuable both for Infant Welfare propaganda and for actual improvement of home conditions, yet full benefit cannot be obtained until a larger staff of Nurses is supplied to cope with the repeat visits. Number of births on Infant Welfare Register, 570.

It is obvious that one Nurse cannot keep all these visits up to date.

Instructions and demonstrations have been given on a very small scale.

This has been due chiefly to lack of accommodation. As soon as the new premises are available a course of lecture and demonstrations on ante-natal and infant care will be commenced.

Great interest has been taken by parents in the few exhibits we have had room to display.

Visits have recently been made to Gopeng Dispensary with a view to extending the Welfare work.

An Infant Welfare Exhibition and Baby Competition was held on December 7th at the Ipoh Town Hall.

The aim of the Exhibition was directed towards instruction in the care and management of infants rather than towards maternal hygiene. Appended is a report on the Exhibition.

Appended is a chart obtained from the Health Office, showing the Infant Mortality rate (calculated from births per month and deaths per month) over a period of six years.

E. B. JACQUES,
Lady Medical Officer,
Infant Welfare Centre, Ipoh.

RECORD FOR 1924, INFANT WELFARE CENTRE, IPOH.

TOTAL NUMBER OF ATTENDANCES FOR THE YEAR 1924.

Month.	Up to one year. Infants.	One to five years. Babies.	Five to fourteen years. Children.	Fourteen years and over. Women.	Total.
January, February, March	983	(No separate record)			
April	64	180	91	138	473
May	68	192	183	238	681
June	95	282	240	300	917
July	104	331	263	343	1,041
August	213	301	241	296	1,051
September	214	383	315	369	1,281
October	202	400	276	388	1,266
November	241	404	262	352	1,259
December	215	421	252	417	1,305
	1,416	2,894	2,123	2,841	9,274
				Add January, February and March	983
				Total	10,257

Attendances by Nationality.

Month.	Malays.	Chinese.	Indians.	Others.	Total.
January / February / March	162	513	297	11	983
April	66	268	104	35	473
May	63	385	217	16	681
June	77	535	284	21	917
July	109	601	319	12	1,041
August	85	594	359	13	1,051
September	109	701	431	40	1,281
October	149	748	352	17	1,266
November	131	745	367	16	1,259
December	143	712	436	14	1,305
Total	1,094	5,802	3,166	195	10,257

Women.

Month.	New.	Repeat.	Total.
January / February / March	Included in town dispensary figures—no separate record kept		
April	104	34	138
May	195	43	238
June	231	69	300
July	229	114	343
August	212	84	296
September	219	150	369
October	262	126	388
November	231	121	352
December	258	159	417
Latter six months total	1,411	754	2,165

Children 5-14 Years.

January / February / March	712	271	983
April	78	13	91
May	151	32	183
June	165	75	240
July	163	100	263
August	147	94	241
September	181	134	315
October	163	113	276
November	167	95	262
December	184	68	252
Latter six months total	1,005	604	1,609

Infants 1-5 Years.

January / February / March	included under children		
April	167	13	180
May	176	16	192
June	222	60	282
July	265	66	331
August	241	60	301
September	264	119	383
October	234	166	400
November	257	147	404
December	264	157	421
Latter six months total	1,525	715	2,240

INFANTS UP TO ONE YEAR OLD.

Month.	New.	Repeat	Total.
January, February, March	... included under "Children"		
April	39	25	64
May	54	14	68
June	67	28	95
July	85	19	104
August	135	78	213
September	122	80	202
October	107	107	214
November	120	121	241
December	* 115	* 100	* 215
Latter six months total	684	505	1,189

WEIGHING CLINIC.

April	2	—	2
May	12	3	15
June	21	5	26
July	36	8	44
August	67	19	86
September	40	41	81
October	62	50	112
November	36	71	107
December	† 33	† 53	† 86
	309	250	559
Ante-Natal Clinic	57	41	98
Health Visiting	532	689	1,221

NUMBER OF WORKING DAYS PER MONTH OF INFANT WELFARE CENTRE AND AVERAGE DAILY ATTENDANCE.

	Days.	Average daily attendance.
April	19	21.5
May	22	30.95
June	21	43.6
July	24	43.3
August	22½	46.6
September	24	53.3
October	25	50.6
November	21½	58.4
December	23	56.7

E. B. JACQUES,
Lady Medical Officer,
Infant Welfare Centre, Ipoh.

* The figures do not include children coming only for entry to the baby competition.
† The figures do not include those weighed for the baby competition.

REPORT ON INFANT WELFARE EXHIBITION AND BABY COMPETITION, IPOH, FOR THE YEAR 1924.

An Infant Welfare Exhibition and Baby Competition was held in the Town Hall (lent by the courtesy of the Kinta Sanitary Board) at Ipoh on Sunday morning, December 7th.

The object of the Baby Competition was to attract mothers to the Exhibition, where were displayed specimens, models, posters, etc. (*vide infra*) illustrating the first principles of infant management along scientific lines.

In arranging the Exhibition, great care was taken that nothing should be shewn or advised that was not either familiar to, easily obtainable by, and expedient for use by, the poorest and most ignorant of parents.

As far as consistent with modern teaching, native materials, modified to suit our requirements were employed. All exhibits, etc., specially those involving the slightest difficulty of comprehension (e.g., photographs of disease), were explained in suitable language by Nurses. A number of the exhibits used were selected from those lent by the Infant Welfare Advisory Board. Others were lent by the District Hospital, Georgetown Dispensary, Pritchard & Co., and the Infant Welfare Centre, or else purchased locally. Posters and placards were almost all lent by the Infant Welfare Advisory Board.

The Police and the Girl Guides lent valuable assistance at the Exhibition outside as well as inside the Town Hall. The Exhibition and Baby Competition were not widely advertised beforehand. This was because the outlay of a large sum of money in Ipoh was not considered desirable so soon after the Exhibition held at the Agri-Horticultural Show in Kuala Lumpur. Nevertheless though the advertising was limited to letters, a few press notices, a notice on the screen of the cinema theatre and the distribution of handbills, the number of visitors was most satisfactory and exceed our expectation.

Great interest was taken in everything. The entries for the Baby Competition were as follows:

Malays	20
Eurasians	3
Indians	65
Chinese	82
Total ...	170

Money prizes were provided by the Infant Welfare Advisory Board and were presented by Mrs. E. A. Dickson who kindly came over from Batu Gajah for the purpose.

In order to expedite the judging each class had its own judges consisting of European and Asiatic ladies and gentlemen including a doctor.

I would like to record here my sincere thanks for their valuable assistance and the interest which they displayed.

Description of Exhibits and Demonstrations, Etc.

Simple preparation for confinement.

1. Two model Malay houses, the rooms of which were arranged to illustrate the right and wrong types of lying-in rooms. Native mats, bedding, utensils, etc., were obtained in miniature, and arrangements, where not inconsistent with our teaching, were made to conform as much as possible with Malay customs.

2. (*a*) *A Trestle Bed* made up hospital fashion, brown paper was used as substitute for macintosh.

(*b*) A table which held basins, soap and nail brush.

(*c*) Jugs of hot and of cold water.

3. Posters giving advice to expectant and nursing mothers as to their diet.

4. Materials suitable (as used in hospital) and unsuitable (these latter being the usual selection of things used habitually by the Chinese and the Malays) for dealing with the cord.

Pamphlet on Tetanus Neonatorum.

5. *Care of Teeth.*—

(*a*) Posters and placards giving advice of the care of the teeth.

(*b*) Models of jaws showing results of dummy and of thumb sucking.

(*c*) Model showing decay of a tooth, (i) active and (ii) arrested by repair of the tooth.

(*d*) Suitable and unsuitable foods were shown and the effect on the teeth and jaws explained.

(*e*) Cheap materials (salt, bicarbonate of soda and borax) suitable for cleansing the mouth and teeth.

(*f*) Best types of tooth brushes.

6. *Clothing of Babies.*—Clothing suitable and unsuitable for Chinese, Malay, Indian and European children, with special reference to the possibility of using the native garments slightly modified.

Small dolls dressed in clothing rational for a baby of any nationality in the Federated Malay States were distributed for demonstration purposes.

7. *Premature Infant.*—In an improvised incubator—a soap box lined with tow and a blanket, lay a doll in cotton wool representing a premature infant. Correct method of feeding and of oiling the infant were shown.

8. *Bathing.*—Zinc bath on the floor on a mat. Handy table and cupboard made from a soap box, containing bowl of boracic lotion and swabs, soap, towels. vaseline, dusting powder, etc., and infants' clothing. Demonstrations were given by the Chinese Amah on the method of bathing and dressing a young baby—explanations were made in the various languages. This demonstration and the model lying-in rooms were the items in which the greatest interest was taken by the visitors.

9. *Sleep.*—(*a*) A rotan cot (on a low stand) with simple bedding and a mosquito net showed an easy and safe cot suitable for any normal baby.

(*b*) Posters demonstrating various proper and improper methods of sleeping accommodation for infants.

10. *Feeding of Infants.*—Preservation of food.

In this section it was difficult to refrain from overwhelming the mothers with information.

Nevertheless, we firmly adhered to the resolution of keeping the exhibits simple.

(*a*) The right and the wrong type of feeding bottle—with reasons.

(*b*) Method of cleaning and storing bottles and teats.

(*c*) Posters and models showing capacity of an infant's stomach at various ages.

(*d*) Quantity and quality of food suitable for infants of various ages.

(*e*) Types of milk suitable where artificial feeding is required.

(*f*) Demonstrations by a Nurse of the method of preparation of feeds of:

Cow's milk;
Condensed milk;
Dried milk;
for infants of stated ages.

(*g*) Simple method of pasteurising milk.

(*h*) Storing of milk.

(*i*) Fruit juice and method of preparing it.

(*j*) Food storage cupboard containing milk and fruit suitably stored.

(*k*) Suitable and unsuitable food for the young child.

11. *Disease.*—(*a*) A very few photographs were shown of "Before" and "After" a few diseases, e.g., rickets, spinal caries and smallpox.

(*b*) Pamphlets, etc., on several diseases, e.g., smallpox, hookworm and tuberculosis, were distributed.

Appended are three snapshots showing a few of the exhibits and a group of the "prize babies".

E. B. JACQUES,
Lady Medical Officer,
Infant Welfare Centre, Ipoh.

ANNUAL REPORT OF THE CENTRAL MENTAL HOSPITAL.

Sir,—I have the honour to forward herewith the fourteenth annual report of the Central Mental Hospital, that for the year 1924.

	Males.	Females.	Totals. Males.	Totals. Females.
2. There remained on December 31st, 1923	900 ...	254		
Admitted during 1924	424 ...	105		
Discharged—Recovered	166 ...	35		
Relieved	8 ...	8		
Not improved	6 ...	4		
Not insane	5 ...	—		
Absconded	50 ...	1		
Died	57 ...	23		
Remaining on 31st December, 1924	— ...	— ...	1,032 ...	288
Singapore.—				
Remained on 31st December, 1923 ...	129 ...	126		
Discharged during 1924	3 ...	4		
Absconded	2 ...	—		
Died	4 ...	12		
Remaining on 31st December, 1924	— ...	— ...	120 ...	110
Criminals.—				
Remained on 31st December, 1923 ...	73 ...	2		
Admitted during 1924	21 ...	—		
Discharged	13 ...	—		
Absconded	— ...	—		
Died	6 ...	—		
Remained on 31st December, 1924	— ...	— ...	75 ...	2
Kedah.—				
Remained on 31st December, 1923	81 ...	15		
Admitted	52 ...	12		
Discharged	23 ...	4		
Absconded	6 ...	—		
Died	9 ...	—		
Remaining on 31st December, 1924	— ...	— ...	95 ...	23
Total remaining on 31st December, 1924	— ...	— ...	1,322 ...	423
Percentage of recoveries	... 37.99			
,, ,, deaths on total treated	... 5.06			
,, ,, ,, daily average	... 6.66			

3. This shows an increase of 163 against 150 last year, and 117 in 1923. There was an increase in all classes save Singapore where there was a reduction of 25—9 males and 16 females, which reduction will now go on steadily as we have ceased to take patients from Singapore. The criminals only increased by 2 compared with 8 in 1923 and 9 in 1922. The Kedah patients increased by 22 against 12 in 1923 and 34 in 1922. The most alarming point in those figures is that the principal increase is in our own Federated Malay States patients, who increased by 166 against 150 in 1924 and 117 in 1923. The female increase of 34 is again heavy though not so heavy as in 1924 when it was 44, but is bad compared with 11 in 1922.

4. The increase is principally due to a heavy admission particularly in the last quarter, which is unusual. The discharges are about the same, and the number of deaths considerably less, which, of course, also helps to increase the total remaining at the end of the year.

5. *Admission.*—The total admissions for the year numbered 614, which is the highest figures we have ever had, being 10 more than in 1922 and 13 more than last year. The number of admissions are more the remarkable when one remembers that for the first time for over 10 years we had no Singapore admissions.

6. In the statistical tables I shall as usual deal only with the Federated Malay States patients save in table 1, though one might treat the Kedah patients now as direct admissions, seeing there is so little delay in sending them; however, as they are not Federated Malay States patients I have not included them.

7. Federated Malay States admissions totalled 529 (424 males and 105 females) against 469 last year and 474 the year before.

8. This is the first time our Federated Malay States admissions have exceeded the 500. Of these, 105 were females, which has only been exceeded once, i.e., in 1923.

9. A marked figure of the admissions is the large number in the last quarter of the year. In fact October and December were two of the heaviest months.

10. I have attached a table showing the districts from which our patients were drawn. The district from which we get most of our patients are Kuala Lumpur 92, Seremban 63 and Ipoh 61. These are the three districts with the largest population and also the districts containing the largest towns.

11. With regard to the form of mental diseases on admission it will be noted that primary dementia heads the list with 114, recent mania second with 89, and recent melancholia 78, while confusional insanity occupies the fourth place.

12. The large increase in cases of primary dementia is to some extent due to a slightly modified conception of the diseased in conformity with the more recent teaching.

However, it is a most alarming condition of affairs, as primary dementia, or as it is called by the man who first described it, Kraeplin, dementia praecox, by which name it is also known in America, is a disease of adolescents, and young adults. The disease tends even if a first attack is recovered from, to recur at a later date with every prospect of the victim ending his days in a mental hospital. Heredity is a factor, and I fear over education or education driven too fast. To attempt to educate a people in two or three generations up to a standard of a 1,000 years and more, is to put a great strain on the mental health of that people.

13. *Discharges.*—The total discharges (Federated Malay States patients) during the year was 232 against 225 last year. Of these 201 were discharged as recovered against 194 last year, though the recovery rate is less owing to the very large admissions during the last three months of the year. How this effects the recovery rate is that these admitted from October have little chance of being discharged before January so that this has reduced our recovery rate this year, but should in turn swell that of next year.

14. Looking at table 3 it will be seen that the largest number of recoveries was from recent melancholia, with recent mania next, and confusional insanity third. Last year recent mania headed the list of recoveries but as can be seen recent melancholia has displaced it this year. Confusional insanity occupies fourth place while primary dementia takes third place. If, however, we take the proportion of recovery to incidence we see that confusional insanity is much more recoverable than primary dementia and moreover is much less likely to recur. One wonders how many of these cases of primary dementia recovered will recur. I fear a great number.

15 The recovery rate works out at 37.99 which is lower than either last year or the year before, which show rates of 41.36 and 42.04. The average for the last ten years works out at 42.11. It should be pointed out in this paragraph too that admissions of irrecoverable diseases, imbecility, general paralysis of the insane and dementia, particularly senile dementia, were very heavy.

16. *Aetiology.*—Turning to the aetiological (table 4) we find "Gastro intestinal system" at the head. This, of course, includes intestinal parasites and various other intestinal troubles. Haemopoietic system comes next, cardio vascular degeneration next, followed by alcohol and syphilis. Malaria comes immediately after syphilis. This order is the same as last year.

17. This matter of numbers shows alcohol and syphilis occupying the 4th and 5th places on the list but if we analyse the figures we will see that in reality alcohol and syphilis are much more dangerous than any of the others because, whereas alcohol and syphilis appear almost invariably as primary causes, the others are almost always found as merely contributary causes.

18. "Gastro intestinal system" for example does not appear once as a primary cause whereas alcohol appears 30 times as primary out of a total of 38 appearances and syphilis appears 24 times as a primary cause in 28 appearances. Syphilis, I fancy, should appear more often, but we do not enter syphilis as a cause unless we get a positive Wassermann, and as we do not send up all the bloods to test, it is quite possible a great many escape notice. I hope to be able to arrange to have more Wassermanns done in future.

It must also be remembered that most of the cases attributed to cardo vascular degeneration may be attributed to either alcohol or syphilis.

19. I again differentiate, when making up the aetiological table between Chinese and Tamils whose illness was due to alcohol, and find that the Chinese appeared two and a half times as often as Tamils.

20. This for a race that used to be known for its sobriety is distinctly disquieting and I am firmly convinced that the giving up of opium is leading the Chinese to alcohol, and that being so all one can say is that the last state of these men is worse than the first.

When one thinks of the crimes attributable to alcohol we cannot face the prospect with equanimity.

21. Malaria though holding its own position shows many fewer actual appearances in the table. "Privation and starvation" have almost disappeared from the table, but "critical periods" show an increase while "mental stress" shows a marked increase. It is significant that this should synchronise with a marked increase in primary dementia.

22. Heredity only appears ten times but this is due to people still looking on mental disease as something to be ashamed of. It is strange; yet people rather boast about having being operated on. So much for the custom of generations; I hope some of us may live to see a more enlightened view taken.

23. As usual a form was sent to the friends of any patient when the friends were known. The form when the friends were found was filled up, as a rule, and returned; but it was remarkable the frequency with which the letter was returned by the post office. In many cases the Chinese Protectorate or the Police were able to find the person, but it appeared in a good many cases that no such person existed and one was driven to wonder if the name put down on the patient's papers was simply put down for a joke, or merely not to disappoint me by leaving a blank.

24. *Deaths.*—The total deaths number 111, giving a death-rate of 5.96 on total treated and 6.66 on daily average which is lower than last year, and is in fact the lowest we have ever had. The average of the last ten years is 9.19. I have continued my policy of isolating all cases of dysentery and phthisis, and taking all cases of intestinal parasites we had and treating them in a special ward. I am also now starting a system of having the stools of every chronic patient examined when he comes up for his periodical examination.

25. The principal causes of deaths were phthisis, dysentery and G.P.I. The deaths from phthisis have increased, and head the list but I must point out that mental cases are particularly prone to tubercular disease, more especially phthisis. In addition it should be remembered that the daily average of patients is 1,669 against 1,495 so that the proportion is practically the same 1.61 against 1.53.

26. *Suicides.*—I am glad to say we had no suicides during the year.

27. *Fatalities.*—We had four fatalities during the year. Two were due to accidents in each case due to falls in the ward. The others were due to blows sustained in fighting with other patients. I fear we can never hope to escape the latter as long we have patients with enlarged spleens, as it is impossible at times to prevent quarrels and very often the first warning one has that there is anything wrong is a blow.

28. *Abscondings.*—There were 60 cases of absconding including Unfederated State patients.

29. Of these, of course, a good many were recaptured, but some never returned, and others returned as new cases with fresh certificates.

30. I suppose some people throw up their hands at the appalling state of affairs which must exist when 60 patients can get away in one year. But I think those will probably be people who know nothing of my methods. Those who do will know that my practice is to give as much freedom as possible, and to give as many patients as possible the advantage of healthy employment. I would prefer to have escapes rather than have patients cooped up in the wards and cells all day, the latter method being the surest way to push patients into dementia.

31. It is a remarkable fact that very few escaped from the farms where, of course, a patient could walk away any time he liked. Most of these who did, came back within 24 hours of their own accord. Many of the escapes from working parties were due to carelessness of the attendants and in the few cases where escapes took place from the wards the cause was gross carelessness on the part of attendants. There is no excuse for these latter.

32. *Criminals.*—There were 21 admissions during the years against 32 the year before, 13 discharges against 16, and no abscondings against 2. The deaths have been the same, i.e., 6. The criminals showed the same types as the ordinary patients. Some had become insane while undergoing sentence. Some had been found guilty but insane, and were sent here during the Sultan's pleasure. Others again were sent in under observation. Of the latter 5 were not insane, 3 of whom were definitely malingering. Two of the latter were convicted, but the third unfortunately got off.

33. *Kedah.*—We had 64 admissions against 50 the year before, and 54 in 1922. We discharged 27 against 16 in 1923 and 11 in 1922 so that the Kedah recovery rate has improved and is much higher than the Federated Malay States rate.

34. The deaths numbered 9 against 14 the previous year and 5 in 1922. I had intended including Kedah patients in the general table, but decided to carry on with the old system, though it might be of advantage if the figures were all lumped together.

35. *New Buildings.*—The only new building begun during the year was a 40-bed ward of the 1924 programme which was begun in November. Though no other work has begun the plans for the first class ward were definitely agreed upon, and I hope we may soon see a commencement made with the work.

36. *Farms.*—The farms were again a success and we have under cultivation now 290 acres. All the vegetables consumed in the hospital were grown on our own farms. The total amount of vegetables supplied was 254,169 katis, 6 tahils, value at $14,595.58. In addition we supplied milk, pork and fruit, while our wood-cutters supplied firewood to the value of $18,856. The total value of produce supplied by the farms including wood supplied by the wood-cutters was $38,856.85.

37. In December we opened a new farm to accommodate 25 patients, which should increase our capability for production, and provide economical accommodation for patients, to say nothing of the most valuable use which is to promote a healthy atmosphere, and employment to encourage a return to normal health.

38. One has no conception of the value of outdoor employment, and healthy exercise in the treatment of mental cases, which is, as I have before stressed, the reason why we produce so much revenue saving work.

39. The pigs throve exceedingly during the year and two China-Manilla boars, which the Agricultural Department was good enough to procure for us, have proved a great success.

40. The cattle have been through a bad time so that the milk production is considerably less than last year. The Veterinary Department, too, must be tired of the name of Tanjong Rambutan.

41. However, we seem to be over the worst time now. I put up new cowsheds and moved all the cows out of the old sheds, and began giving the cows bone meal to replace a supposed phosporus shortage.

42. I must thank the Agricultural Department and the Veterinary Department for the valuable and unstinted help they have given.

43. I attach a complete list of the produce supplied by the farms.

44. *Work.*—I also attach a list of the work done, both in the field and in the workshops, and the value. Here again I would point out that the value of the work cannot be estimated in dollars and that in fact the dollar value is the least important aspect.

45. As usual all clothing, both patients' and attendants', male and female, has been made in the work-rooms, and in addition a considerable amount of mending was done in the female side.

46. Our outdoor work included house building and repairing, bridge building, draining and levelling.

47. *Anti-Malarial Work* comes under two heads: oiling which was in the hands of the Mosquito Destruction Board, and draining and filling which we undertook. The main part of the anti-malarial scheme is to deal with the Sungei Bulat, and this was carried a step further, and a very important step as, though the section lowered, concrete inverts laid, and banks sloped and sodded is not a long one, it included a section which receives the two largest tributaries. The work was hindered all the year by rain, and in addition by the sandy nature of the soil in which we were working. The result being that every rain storm brought down cart loads of sand which smothered the inverts already laid.

48. I eventually had to divert the stream temporally to allow any progress to be made. One section through which we worked measured 13 feet from the top of the bank to the bottom of the invert.

49. In addition we made and laid 5,925 sub-soil pipes ranging in the size from 2 to 8 inches.

50. The daily average of malaria cases was patients .41 on cases and .35 on individuals which is less than last year when the figures were .61 and .56 respectively. The rate for attendants was .2.

51. *Staff.*—The staff has been satisfactory.

On March 3rd Dr. J. G. Dunlea was lent for duty and I again had an Assistant Medical Superintendent, after being single-handed for 10 days less than a year. On September 12th Dr. Wilson arrived from home and took over from Dr. Dunlea who reverted to the duties of a Medical Officer.

52. On February Mr. Gopal Menon arrived from India to take up the duties of Second Assistant Physician. This is the first time I have had the prospect of having a Second Assistant Physician as a permanent man.

53. Mr. Sababpathy was relieved by Mr. Subramaniam on 1st February, 1924.

54. Mr. David was appointed on 25th February, 1924, to the new post of clerk, class III.

55. Mr. Sivagnanam was appointed chief clerk on 1st July, 1924, in place of Mr. Hendricks who was transferred.

56. Mr. Mahmud bin Sheik Abdul Majid left the service on 3rd December, 1924, and the vacancy has not yet been filled.

57. Mr. Christie left the service on 19th September, 1924, and was replaced by Mr. Tan Seang Hong who assumed duty on 24th October, 1924.

58. Mr. Navaretnam was engaged as a probationer dresser on 13th March, 1924, another new appointment.

59. There were four candidates for the Medico Psychological Association's Nursing Certificate—Mr. Thambiah who sat for the final and Nurse Prem Kaur, Nurse De Castro and head attendant Kesari Rai who sat for the Preliminary.

60. The attendants were much as they have been for some years now—unsatisfactory on the whole, and one fears we will never again see the type who was reliable, and content to really take up the work permanently. Most of our old reliable attendants of over 10 years' service are now head attendants. Many of our charge attendants who were at one time men of five to ten years' service are now men of three years. Of course new appointments amongst the assistant head attendants removed many charge attendants by promotion and the rapid increase in the number of the wards made it impossible to find long service men for the posts. The chief cause I fear, however, is that we are not getting the same class of men in spite of high salary and in many ways better conditions.

61. *Maintenance.*—The maintenance rate is $174.23 per head per annum against $176.88 per head per annum last year and $182.14 in 1922.

62. *Amusements.*—The usual games, drafts, chess, dominoes, etc., were played by the patients in the wards. Sunday walks were taken in the grounds, and suitable patients were taken to the town on Sunday mornings. When a travelling cinema or circus was in the town any patients fit to go were taken, but cinemas do not appear as numerous as in previous years. The sports were as usual held in July and provided a day's amusement for patients and attendants alike. Cricket and football were again played, but the teams were not so strong as last year though the cricket team held its own fairly with the local sides; all the teams in the district being met, the majority of them twice.

63. In closing my report I should like to again thank Government for its continual help and support.

W. F. SAMUELS,
Medical Superintendent,
Central Mental Hospital, Tanjong Rambutan.

ANNUAL REPORT OF THE MALARIA ADVISORY BOARD.

1. Five meetings of the Board were held during the year on the following dates: 13th February, 16th April, 4th July, 28th August and 14th November.

2. The following are the principal subjects which came before the Board for consideration during the year. The Board's views and decisions on the various matters are appended under each heading.

LEGISLATION FOR DEALING WITH MALARIA.

3. This subject which formed the matter for discussion at several meetings of the Board held in 1922 was again brought up for consideration at a meeting of the Board held on the 13th February, 1924. At this meeting the Board was asked to consider the amendment of section 4 of the Sanitary Boards Enactment by the insertion of two new paragraphs:

(*q*) "The draining, filling or reclaiming of land, provided that no owner shall be required to incur expense in excess of the difference in value of his land before and after such draining, filling or reclaiming;

(*r*) The prevention and abatement of mosquito breeding on wet lands or in and about any pond, well, spring, drain or stream".

The opinion of the Board was that paragraph (*r*) of the proposed amendment should have an additional paragraph giving the Sanitary Board power to make owners pay the cost of preventing and abating mosquito breeding, as otherwise public funds will have to bear the cost of measures to remedy conditions for which individual owners alone are responsible.

The disposal of mosquito breeding receptacles and prevention of breeding therein can with advantage be required of the individual, but measures for the prevention of breeding on wet lands cannot safely be left with the individual; such work would be more economical when done by public bodies.

The Board agreed with the following new by-law 192 drafted by the Hon'ble Legal Adviser:

(i) The occupier of any land or premises, and in the case of unoccupied land or premises, the owner thereof, shall keep such land or premises in such a state as not to be nuisance, or offensive, or an annoyance to any persons living in the neighbourhood, and in such a state as not to cause or to be likely to cause danger or be prejudicial to health or to favour the existence or propagation of mosquitoes and in particular he shall

(*a*) prevent the accumulation anywhere therein of dead vegetable matter, manure, refuse or of any other noxious or unsightly matter;

(*b*) keep down the growth of useless vegetation therein;

(*c*) keep the said land or premises clear of empty tins, cocoanut shells, or other disused or unused matter or receptacles capable of retaining water and prevent the accumulation of such matters or receptacles except in a place suitable for disposal and in such manner that they are not liable to retain water;

(*d*) prevent the formation anywhere therein of pools of waste or stagnant water or sullage and prevent the making of any excavation on the said land likely to retain water without the previous permission of the Board in writing;

(*e*) keep clean any cistern, water butt or other receptacles used for the storage of water and keep the same covered or protected in such manner as to prevent the breeding of mosquitoes therein;

(*f*) maintain in good repair any fence or hedge bordering upon a public thoroughfare, and at any time when so ordered by the Board in writing, repair any such fence or hedge or remove any tree overhanging a public thoroughfare or trim, prune or cut any such tree or hedge to such an extent and in such manner and within such time as may be specified in the order.

(ii) Whenever it appears to the Board that any land or any pond, tank, well, spring, drain, stream, waterlogged ground or swamp, or other collection of water therein is or is likely to be prejudicial or dangerous to health or a nuisance or offensive to health or favourable to the existence or propagation of mosquitoes the Board may by notice in writing require the owner of the land to take, within a reasonable time to be specified in such notice, such action in regard to such land or pond, tank, well, spring, drain, stream, waterlogged ground or swamp or other collection of water therein as may in the opinion of the Board be necessary to prevent the land or water therein being prejudicial or dangerous to health or a nuisance or offensive or favourable to the existence of mosquitoes.

The Board considered that its suggested amendments to section 13A which are to extend the existing section 13A and provide for owners of land specially benefiting by drainage work being assessed with a fair proportion of the cost, should be enacted.

With regard to the suggested amendments to the Land Enactment the Board expressed the hope that these will not be lost sight of when this Enactment is being redrafted.

The Board suggested that a clause to prevent indiscriminate clearing of "Ravines" and "Hill-Foots" similar to clause (*w*) of section 140 of the Straits Settlements Labour Ordinance of 1923 should be incorporated in the new Land Enactment.

The Board informed Government that it was of opinion that the suggested amendments and alterations to the Sanitary Board and Land Enactments which are the outcome of careful consideration by those who have had considerable experience cn the conditions appertaining to the question of malaria prevention, should have the careful consideration of Government with a view to their inclusion when the existing Enactments are further amended.

GOVERNMENT'S POLICY IN REGARD TO ANTI-MALARIA MEASURES.

4. This matter was considered at several meetings of the Board held in 1923. After further correspondence with Government the following was officially published as the policy of the Federated Malay States Government with regard to anti-malaria measures:

(i) In dealing with anti-malaria measures, Mosquito Destruction Boards and Health Officers should act upon the principle that every land proprietor is under the burden of carrying out proper and reasonable anti-malaria measures upon his land: provided, however, that (i) in the case of small holdings (i.e., holdings not exceeding 25 acres: *see* section 159 of the Labour Code, Enactment 18 of 1923) and (ii) in the case of all areas in any Sanitary Board area, the Mosquito Destruction Board may assume the burden of carrying out all proper and reasonable measures, and if it desires to do so can recommend the imposition by the Sanitary Board of an assessment to recover the cost.

(ii) In all railway reserves, the proper and reasonable burden lies upon the Railway Department, and in respect of all Government reserves and State lands, the proper and reasonable burden lies upon the Mosquito Destruction Board.

(iii) In order that anti-malaria measures may be effectual there should be co-operation of proprietors of contiguous estates amongst themselves, and with the Mosquito Destruction Boards and the Health Officers.

Advertisements on this subject were inserted in the monthly journal of the Incorporated Society of Planters and also in the monthly Bulletins of the Rubber Growers' Association, London.

EARTH DRAINAGE BY THE HEALTH DEPARTMENT.

5. The question as to whether the Health Department should carry out temporary anti-malaria drainage or whether all drainage should be done by the Public Works Department was considered at a meeting held on the 13th February, 1924.

At this meeting the Senior Health Officer, Federated Malay States, stated that in the past temporary ditching for anti-malaria measures has always been considered a duty which should be carried out by the Sanitary staff of the Health Officer and that 13 years' experience has proved its efficiency. He further pointed out that the Engineers have always acquiesced in this arrangement and he is strongly of the opinion that open ditching does not require special engineering knowledge and that the arrangement heretofore satisfactory should be continued.

Mr. Evans, the Anti-Malaria Engineer, considers that under the present conditions the work is probably better carried out by the Health Department than the Public Works Department but that in principle it is incorrect. The Board agrees with the principle that the Public Works Department should carry out all ditching and drainage but at the present time the Health Officer must use his discretion in carrying out any drainage work as he is responsible for the control of malaria. Nothing matters as long as malaria is decreased.

The Senior Health Officer does not agree with the principle that the Public Works Department should do all drainage work.

MALARIA AT SABAK BERNAM.

6. The Malaria Research Officer (Dr. H. P. Hacker) investigated an outbreak of malaria at Sabak Bernam in the latter part of 1923 and the results were not available at the end of the year when the report of that year was in preparation as the investigation was still proceeding.

At a meeting held on the 13th February, 1924, Dr. Hacker places a number of very interesting photographs illustrating the investigation in progress at Sabak Bernam. He explained the method of working by which the whole of the area is covered. Unfortunately it was necessary for Dr. Hacker to proceed on leave in April and he was unable to submit a report.

HILL MALARIA.

7. At a meeting held on the 16th April, 1924, the attention of the Board was drawn to the possibilities of malaria in hill stations. It has been generally considered that Hill Stations 4,000 to 5,000 feet above sea-level are comparatively free from malaria although malaria may be prevalent in the places below. That this is a fallacy has been pointed out in a paper by Major H. C. Shortt published in a recent number of the *Indian Journal of Medical Research*. Major Shortt records how malaria increased at Shillong, a hill station in Northern India, probably due to the infection of the existing anopheline fauna by infected summer visitors chiefly from Bengal and Assam, both notoriously malarial provinces.

The Board considered that in view of the above facts anti-malarial measures should be taken on the very commencement of opening a hill station.

The Board particularly drew attention to Cameron's Highlands and to the possibility of infecting the existing anopheline of the *A. maculatus* variety, at present uninfected, by neglecting anti-malarial measures when this station is opened up.

"PARIS GREEN" AS A LARVICIDE.

8. The question of using "Paris Green" as a larvicide was considered at a meeting held on the 16th April, 1924, at which the Board was informed that experiments in the use of "Paris Green" (arsenic) as a larvicide have been made from time to time in America with very satisfactory results. The usual method in which it is used is to dilute it with road dust in the proportion of 1 part of "Paris Green" to 100 parts of road dust. The mixture is thrown into the air and is carried by the wind. A slowly settling cloud of dust carried along by a light wind is apparently the best agent for the distribution of the dust, the main thing is to start this cloud in the right place and direction. A single cloud may destroy over a wide area and at a considerable distance from the operator. Experiments have recently been made in Kedah with excellent results.

The question of possible danger to coolies using "Paris Green" or to outside people was also considered and Dr. Quaife expressed his strong opposition to any arsenical compound being put into the hands of ignorant coolies.

The Senior Health Officer was asked to make further investigation and field experiments. Reports of the results of experiments with "Paris Green" by the Senior Health Officer and the Malaria Research Officer were put before the Board at a meeting held on 4th July, 1924. The reports proved that "Paris Green" is a larvicide in that it kills larvae of both anopheline and culicine mosquitoes but it does not appear to have any effect on pupae or on eggs.

NOTIFICATION OF MALARIA.

9. A suggestion was put before the Board that propaganda be issued to persons of Chinese and other nationalities explaining that the object of notification of malaria is to direct the attention of the authorities to the area where malaria exists in order that search may be made for the breeding places of the mosquitoes who are the cause of malaria in that area. It should also be made clear that the object of notification of malaria is not to direct attention to any particular person's house but to the possible source of his malaria. The Board decided to refer this question to the Senior Health Officer for action.

THE QUESTION OF SANITATION IN VILLAGES AND RURAL AREAS.

10. At a meeting held on the 4th July, 1924, the Chairman raised this question and read a letter which he, as Principal Medical Officer, Federated Malay States, addressed to the Senior Health Officer, Federated Malay States, and in which he drew attention to the insanitary state of some villages which may or may not be in Sanitary Board areas. He stated that villages which are under the Collector of Land Revenue are often in a very insanitary condition and that the Collector of Land Revenue has little or no staff to deal with sanitation. The Senior Health Officer pointed out that under the present arrangements where the Health Officer is only the adviser to the Sanitary Board but has no executive control of the Sanitary Inspectors of the Board sanitation in villages is not likely to improve.

The Board, while of the opinion that the Sanitary staff everywhere should be under the control of the Health Officer, postpones further discussion until after the publication of the findings of the Estates Health Commission which was considering this matter. The report of the Estates Health Commission was not available at the time of the preparation of this report.

DURATION OF LIFE OF ANOPHELINES IN CAPTIVITY.

11. The Senior Health Officer, Federated Malay States, drew the attention of the Board to a recent article in the United States Public Health Reports on the duration of life of anopheline mosquitoes in captivity. It is shown that in the majority of instances observed the mosquitoes survived only a few days. He is of opinion that screening, even if faulty, is far better than no screening at all.

The general question of the duration of life of mosquitoes was discussed and it was pointed out that when breeding places are destroyed adults disappear very quickly. Instances were quoted of disappearances within a few days or a week. It is generally agreed that the destruction of breeding places is the soundest method of dealing with the mosquito problem.

REPORT OF THE PREVALENCE OF MOSQUITOES ON PETALING HILL, KUALA LUMPUR.

12. The report of a mosquito survey of the Petaling Hill area, Kuala Lumpur, by the local Mosquito Destruction Board was put before the Board for its information, and for an expression of its views as to the best means of dealing with the mosquito problem in this district. The chief anopheline breeding places in this area are swamps, fish ponds, earth wells, and earth drains in vegetable gardens. It was noted that, although a considerable number of anopheline larvae of various species was found, no larvae of *A. maculatus* were discovered. The Board referred the matter to the Anti-Malaria Engineer for his opinion as to the cost of draining or filling of the swamps, whichever method is considered advisable. In the meantime oiling is being carried out.

POWERS OF ENTRY OF MOSQUITO DESTRUCTION BOARDS' PERSONNEL.

13. The question of what powers of entry the personnel of a Mosquito Destruction Board have, has been raised by certain Mosquito Destruction Boards. This subject was discussed at a meeting held on the 28th August, 1924, and it was pointed out that they have no such powers but the onus of applying for such power lies with the Mosquito Destruction Boards themselves.

MALARIA IN RICE FIELDS.

14. The general question of malaria in rice fields had been discussed at several meetings of the Board held in 1922 and 1923 and the Board expressed the opinion that investigations and experiments in this direction should be made and that it would require the full time of an expert investigator. The Board's views were communicated to Government and it was also suggested that an officer be appointed at an early date to carry out this very important work.

Captain Williamson, who was recently appointed for the special purpose of investigating the problem of malaria in rice fields, placed the results of a preliminary investigation of the rice fields in the Krian district before the Board. He outlined the methods in which he proposed to conduct his investigation. It was agreed that Captain Williamson should work in co-operation with the Health Department and that he should accompany the Senior Health Officer, Federated Malay States, on a tour of inspection as a preliminary to a systematic investigation. It was considered that the epidemiological problem should first be settled and in this the health statistics and malaria records should prove themselves of great value. The investigation was still in progress at the end of the year.

SALARY SCHEME FOR MOSQUITO DESTRUCTION BOARDS' EMPLOYEES.

15. A salary scheme for the employees of Mosquito Destruction Boards drawn up by the Senior Health Officer, Federated Malay States, was put before the Board at a meeting held on the 14th November, 1924. He stated that he had enquired into the workings of the various Boards throughout the country and found that their methods and the rates of pay vary greatly. The Board approved of the proposals of the Senior Health Officer, and suggested that he should forward them to the Honourable the British Residents for their information and consideration.

BOUNDARY STONES FOR SUB-SOIL PIPES.

16. The question of fixing marks to indicate the location of sub-soil pipes was discussed at the last meeting of the year when it was decided to have suitable marks fixed on the surface of the ground.

PROPAGANDA.

17. Perhaps the most important propaganda work undertaken by the Board are the exhibits put up at the Malayan Agri-Horticultural Shows. The Malaria Advisory Board stall at the Show held in Kuala Lumpur in July attracted thousands of people. The great majority displayed a keen interest and very much appreciated what they saw. In the month of October another exhibit was put up at the Agri-Horticultural Show in Kuala Langat district. Here the Board's exhibit was also very well

patronised and proved a great success. There is no doubt that exhibits of this kind are far more instructive and more easily understood by the Asiatics than posters and pamphlets. In both of these Shows the following exhibits were shown:

(i) By means of photographs, charts, models, etc., the method of reducing malaria by drainage;

(ii) Personal prophylactic measures to be taken by the individual to prevent being bitten such as screening, etc.;

(iii) Mounted specimens of Malayan anopheles (adults and larvae). A microscope was arranged for the use of visitors;

(iv) By displaying posters on malaria in all languages and by free distribution of malaria pamphlets.

Advertisements have been inserted in the monthly journal of the "Planter" throughout the year. The advertisements advertised in this journal are: (1) "Government's Policy in regard to Anti-Malaria Measures", (2) "Why Risk It?", and (3) "Quinine is the Remedy for Malaria".

Lectures on malaria have been delivered throughout every district in Pahang. These lectures were delivered in Malay and were very much appreciated and proved a great success. The States of Negri Sembilan and Perak were also visited by the Malay lecturer and lectures were delivered in almost every district.

In November, 1924, a Chinese lecturer was appointed by the Committee for Public Health Education, Federated Malay States, and commenced lectures on malaria in Chinese. These lectures were exceedingly well attended and a very keen interest was displayed by the audiences.

Lectures illustrated by lantern slides, which have been prepared locally and are of local subjects which are well known to the Asiatic, are one of the best methods of educating the Asiatic population.

Pamphlets on malaria in English and Jawi were freely distributed at all lectures to Malays, and in English and Chinese for Chinese audiences.

Pamphlets in English on the subject of "Malaria in its relation to Man and Mosquito" prepared by Dr. A. R. Wellington, Senior Health Officer, Federated Malay States, have been sent to planters and English-speaking Asiatics and also to all the Press in Malaya.

Copies of the minutes of all the meetings were sent to the Press for publication, and to the Planters Association of Malaya. Printed copies of these minutes were also sent to the Under Secretary to Government, Federated Malay States, for transmission to the Colonial Office Advisory Medical and Sanitary Committee and also to all the members of the Mosquito Destruction Boards throughout the Federated Malay States.

MEMBERS OF THE BOARD.

18. During the year the personnel of the Board was as follows:

The Principal Medical Officer, Federated Malay States (ex officio), *Chairman*.

The Senior Health Officer, Federated Malay States (ex officio), *Vice-Chairman*.

The Director of Public Works, Federated Malay States.

Dr. A. T. Stanton.

Dr. W. Fletcher.

Dr. W. T. Quaife.

Dr. D. C. Macaskill.

The Anti-Malaria Engineer.

The Malaria Research Officer.

The Hon'ble British Resident, Perak.

The Hon'ble British Resident, Selangor.

The Hon'ble British Resident, Negri Sembilan.

The Hon'ble British Resident, Pahang.

Capt. J. W. Hoflin, Secretary.

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Federated Malay States Government Press.